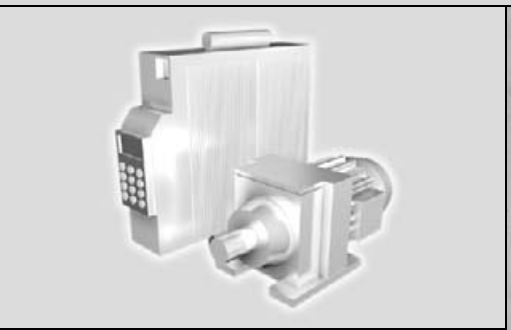
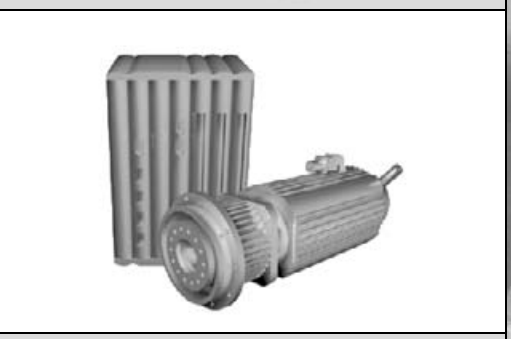
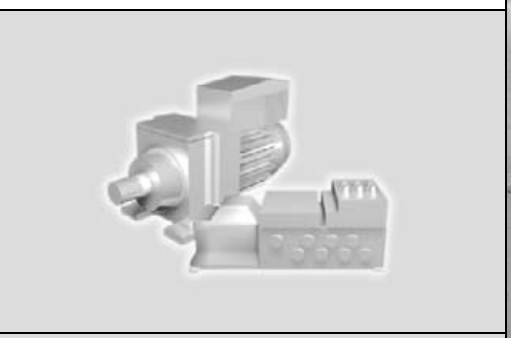
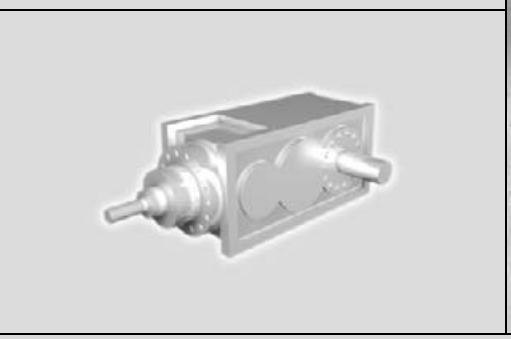
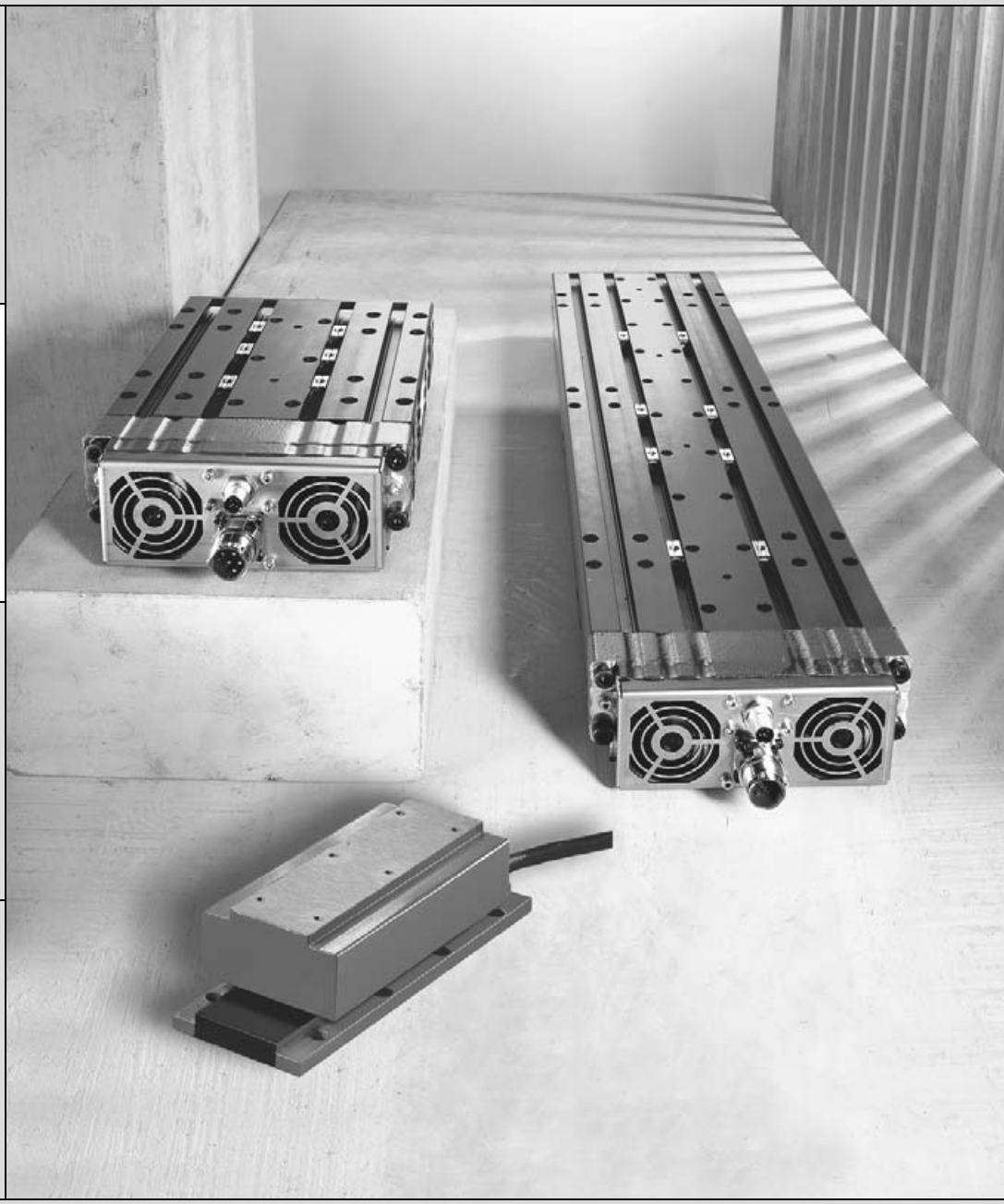
SEW EURODRIVE











SL2 Synchronous Linear Motors

GB260000

Edition 06/2006
11476214 / EN

Operating Instructions

SEW
EURODRIVE

1 Important Information about the Operating Instructions 4
1.1 Explanation of symbols 6

2 Safety Notes 7

3 Product Description and Overview of Types 11
3.1 System environment 11
3.2 Documentation 11
3.3 SL2 product designs 12
3.4 System components for SL2-Advance System and SL2-Power System 13
3.5 Type code 15
3.6 Nameplate 18
3.7 Scope of delivery of system components 20

4 Transportation and Storage 21
4.1 Transport 21
4.2 Packaging 23
4.3 Corrosion protection and storage conditions 26
4.4 Coating 27
4.5 Return delivery to SEW-EURODRIVE 27

5 Mechanical Installation 28
5.1 Installation tolerances 28
5.2 Required tools / aids 29
5.3 Installation of the SL2-Basic 30
5.4 Installation of the SL2-Advance System and SL2-Power System 31
5.5 Installation of SL2 secondaries 33
5.6 Installation of the AL1H measuring system 35
5.7 Mechanical load capacity of the SL2-Advance System and SL2 -Power System 36
5.8 Installation of customer components on primary 37

6 Electrical installation 39
6.1 Electrical connection 39
6.2 Prefabricated cables for SL2-Advance System / SL2-Power System 43

7 Startup 55
7.1 Prerequisites for startup 55
7.2 Commutation travel process 55
7.3 Startup procedure 57
7.4 Calculating travel parameters 60

8 Malfunctions 62
8.1 Problems during commutation search 63
8.2 Problems during operation 64

9 Inspection and Maintenance 65
9.1 General maintenance work 65
9.2 Additional maintenance for Power version 65

10 Technical Data 66
10.1 SL2-Basic motor data 66
10.2 SL2-Advance System motor data 68
10.3 SL2-Power System motor data 70
10.4 Maximum forces with MOVIDRIVE® MDX61B 72
10.5 Part numbers for MOVIDRIVE® MDX61B 75
10.6 Technical data of AL1H absolute linear measuring system 77
10.7 Linear guide systems for SL2-Advance and SL2-Power System 81

11 Declaration of Conformity 83
11.1 SL2 synchronous linear motors 83

12 Index 84

1 Important Information about the Operating Instructions

Integral part of the product

The operating instructions are an integral part of the SL2 synchronous linear motors and contain important information for operation and service. The operating instructions are written for assembly, installation, startup and service employees who are involved in the installation and maintenance of SL2 linear motors.

Designated use

Series SL2 linear motors are motors for industrial and commercial systems. Motor utilization other than that specified and areas of application other than industrial and commercial systems can only be used after consultation with SEW-EURODRIVE.

Do not start up the unit (take it into operation in the designated fashion) until you have established that the machine complies with the Low Voltage Directive 73/23/EEC and that the conformity of the end product has been determined in accordance with the Machinery Directive 98/37/EEC.

Technical data and information about the permitted conditions can be found on the nameplate and in the documentation.

It is essential to observe all the specified information!

Operational environment

The following uses are prohibited unless the units are expressly designed for the purpose:

- Use in potentially explosive areas.
- Use in areas exposed to harmful oils, acids, gases, vapors, dust, radiation. Please contact SEW-EURODRIVE if you have any questions on the environmental conditions.
- Use in non-stationary applications that are subject to mechanical vibration and shock loads in excess of the requirements in EN 50178.

Safety functions

Series SL2 linear motors may not execute any safety functions without master safety systems.

Use higher-level safety systems to ensure protection of equipment and personnel.

Qualified personnel

SL2 linear motors represent a potential hazard for persons and property. Consequently, assembly, installation, startup and service work may only be performed by trained personnel who are aware of the potential hazards.

The personnel must be appropriately qualified for the task in hand and must be familiar with the assembly, installation, startup and operation of the product. The personnel must read the operating instructions, in particular the safety notes section, carefully and ensure that they understand and comply with them.

Liability for defects

Incorrect handling or any action performed that is not specified in these operating instructions could impair the properties of the product. In this case, you lose any right to claim under limited warranty against SEW-EURODRIVE GmbH & Co KG.

Product names and trademarks

The brands and product names contained within these operating instructions are trademarks or registered trademarks of the titleholders.

Disassembly and waste disposal

- Local regulations apply concerning recycling of the operator terminal or parts of it.
- Note that the following components contain substances that may represent a health hazard and cause environmental pollution: Lithium battery, electrolyte condensers and display.

1.1 Explanation of symbols

Hazard

Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.

Warning

Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury. You will also find this signal to indicate a potential risk of damage to property.

Caution

Indicates a potentially hazardous situation which, if not avoided, MAY result in minor injury or damage to products.

Note

Indicates a reference to applications, for example for installation, and other useful information.

Documentation reference

SEW-EURODRIVE GmbH & Co KG makes a reference to existing documentation, such as operating instructions, catalog or data sheet.

As a prerequisite to fault-free operation and fulfillment of warranty claims, you must adhere to the information in the operating instructions. Consequently, read the operating instructions before you start operating the drive!

The operating instructions contain important information about servicing and should be kept close to the unit.

2 Safety Notes

Preliminary information

Due to the strong permanent magnets installed in the secondaries of the SL2 linear motors, the following safety regulations must be observed.

Work not to be carried out by persons with cardiac pacemakers!

The strong magnetic fields and the associated high ferromagnetic attraction forces can be harmful to your health directly, for example for persons with cardiac pacemakers, or indirectly through fast motor movements and high thrust forces.

Based on current medical knowledge, magnetic fields with a flux density of < 5 mT have no effect on the human body.

Hazard caused by magnetic field!

Even at a distance of 100 mm, the magnetic flux density of the present secondaries is < 5 mT (at 150 mm < 0.5 mT) . Since the magnetic flux density in SL2 linear motors is generated exclusively by the magnetic fields of the secondaries, this value is independent from the operating status of the SL2 linear motor.

Special caution needs to be the rule in close proximity (distances < 50 mm) to the secondaries due to the high attraction forces. Magnetic forces are often underestimated since they are not visible.

Magnetic attraction forces often start abruptly in the immediate proximity range and can grow in excess of several 100 kg for medium-sized objects.

Please also consider the supplementary safety notes in the individual sections of these operating instructions.

General information

Burns hazard!

Touching the SL2 linear motor when it has not been cooled can result in burns. The SL2 linear motor can have a surface temperature of over 100 °C.

To prevent burns:

- Never touch the SL2 linear motor during operation or in the cool down phase once it has been switched off.

All work related to transport, putting into storage, setting up/mounting, connection, startup, maintenance and repair is to be carried out by trained personnel only. Note the following important points.

- Pay attention to the danger and safety signs on the SL2 linear motor.
- Do not go near the secondary with metallic objects that are heavy (> 1 kg) or have a wide surface (> 1 dm²) in your hand.
- Place at least two pointed wedges made of firm, non-magnetic material - such as brass or stainless steel (wedge angle ca. 10° - 15°) and a hammer ready to separate the adhering magnetic parts. If necessary, e.g. if mounting space is limited, customized installation appliances should be used to facilitate and safeguard work. To free parts of the body that have been trapped, separate adhering parts by driving the prepared pointed wedges (made of firm, non-magnetic material) into the separation gap.
- Do not bring watches and magnetizable data carriers (such as credit cards, disks, etc.) into close proximity <100 mm of the SL2 synchronous linear motors!
- Note the system-specific guidelines and requirements.
- Note the national/regional regulations governing safety and the prevention of accidents.

Serious injuries and property damage may result from:

- Improper use
- Incorrect installation or operation
- Unauthorized removal of necessary protection covers or the housing

Transportation / storage

Inspect the shipment for any damage in transit as soon as you receive the delivery. Inform the shipping company immediately. It may be necessary to preclude startup.

Use suitable, sufficiently rated handling equipment if necessary. Remove securing devices used for transportation prior to startup.

Follow the instructions in the section "Notes on transportation"!

- Mark the storage locations of secondaries ("Danger! Strong magnetic fields", pictograms).
- Never store secondaries unpacked; use non-magnetic packaging material with a thickness of at least 2 cm on the magnetic side!
- Observe the warning instructions on the packaging.
- Keep storage area dry.
- Protect storage site from heat.
- For transportation of machines or components with primaries or secondaries already installed on travel axis/axes: Lock the axis/axes to prevent accidental movement (due to missing self-locking mechanism).

Follow the instructions in the section "Transportation and storage"!

Installation / assembly

Hazard caused by magnetic field!

- Never place secondaries on metal.
- Never place a primary directly on a secondary.
- Hold the tools tight (with both hands). Slowly guide the tools to the secondary.
- Wear work gloves during assembly.
- Do not remove the packaging of the secondary until directly before it is installed.
- Carry out installation work in pairs only.
- Cover already installed secondaries with at least 2 cm of non-magnetic material (e.g. wood) during installation.
- Use customized installation appliances to facilitate and safeguard work, if necessary (e.g. if mounting space is limited).
- Make sure that the primary is grounded according to regulations via the PE grounding bar in control cabinet as a reference potential.

Please attach the enclosed warning sign in a prominent position or in the vicinity of the secondaries!

Follow the instructions in Sec. "Mechanical Installation"!

Startup

- Never work in the travel range when the machine is switched on.
- Ensure free axis travel.
- Check the final positions.
- Check the linear measuring system prior to turning on the machine.
- Limit the maximum power in the servo controller.
- Set the velocity limits in the servo controller to small values.

Follow the instructions in the section "Startup"!

Operation and inspection / maintenance

Danger of electric shock!

Induced voltages of up to 500 V can be generated by movement of the primary (generator principle) even if the motor is not connected.

Only remove the protection cap on the power plug of the primary immediately before connecting the power plug to the power supply.

To prevent electric shocks:

- **After separating the servo controller from the supply voltage, wait for at least five minutes before you touch any live parts (e.g. contacts, stud bolts) or loosen connections. To be on the safe side, measure the voltage on the DC link and wait until the voltage has dropped below 40 V.**
- Keep motor area free from chips.
- Notice any noises.
- The motors may have a surface temperature of 100 °C during operation. Wait for the motor to cool down to 40 °C before touching it.
- Power connections can conduct voltages even if the motor does not turn. Never disconnect electrical connections of motors while they are energized.
- Wear work gloves when carrying out maintenance and repair work.
- Ensure safe disconnection from the voltage supply before working on the machine.
- Never work in the travel range when the machine is switched on.
- Remove any chips from the motor area on a regular basis.

Follow the instructions in the section "Startup and Maintenance"!

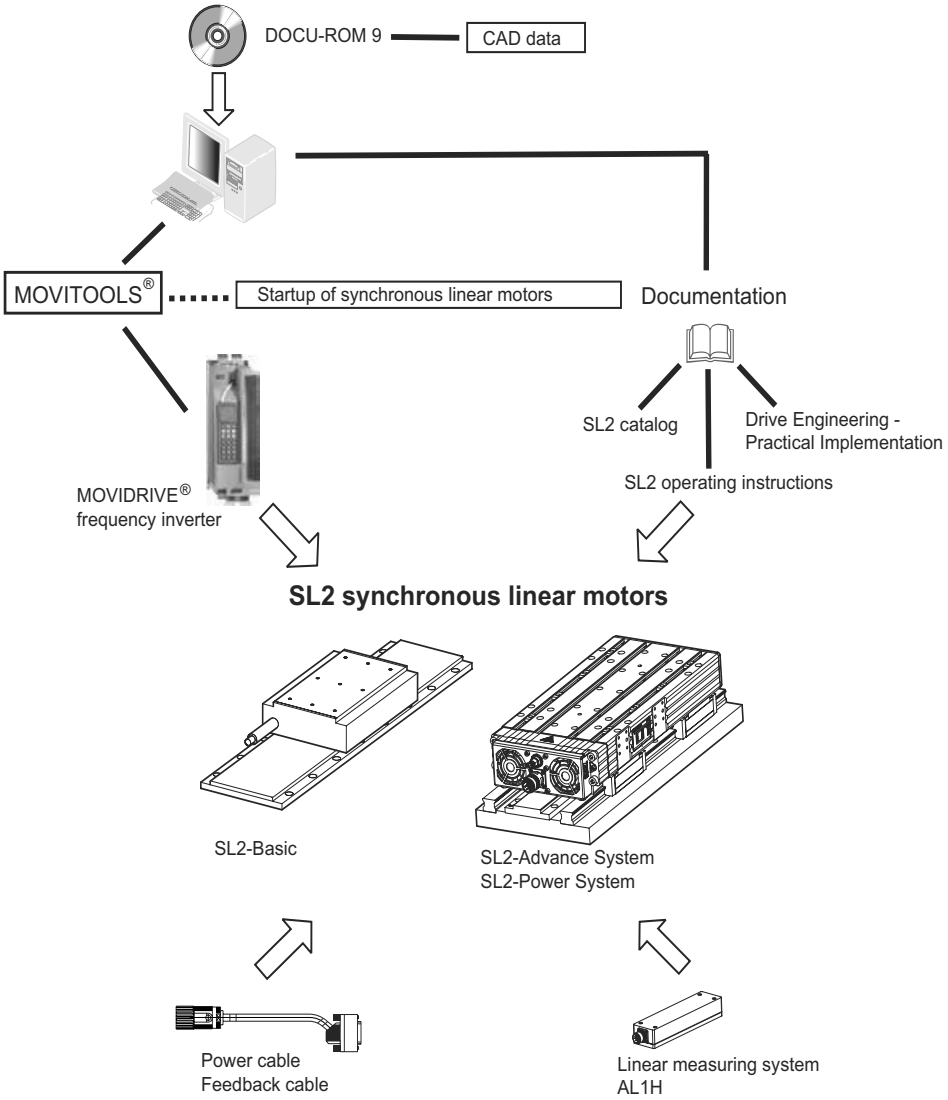
Behavior and immediate measures in case of ACCIDENTS

- Press the EMERGENCY OFF button in case the machine is connected to the power supply system.
- Request first aid immediately.
- You need the tools mentioned previously to free body parts jammed in between two secondaries or a secondary and a ferromagnetic component (e.g. steel plate, steel carrier, machine bed, tool). Separate the components at the separation gap using the pointed wedge.

The magnetic forces are always present regardless of the operating status of the system!

3 Product Description and Overview of Types

3.1 System environment



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3.2 Documentation

- MOVIDRIVE® B manual
- "SL2 Synchronous Linear Motors" catalog
- "SL2 Synchronous Linear Motors" AWTec

3.3 SL2 product designs

SEW-EURODRIVE offers **three** product designs for SL2 linear motors:

SL2-Basic	Motor package and secondaries
SL2-Advance System	Motor package integrated in cooling unit and secondaries. Prepared for installation of linear guides and the linear encoder.
SL2-Power System	Motor package integrated in motor cooling unit with forced cooling fan and secondaries. Prepared for installation of linear guides and the linear encoder.

SL2-Basic

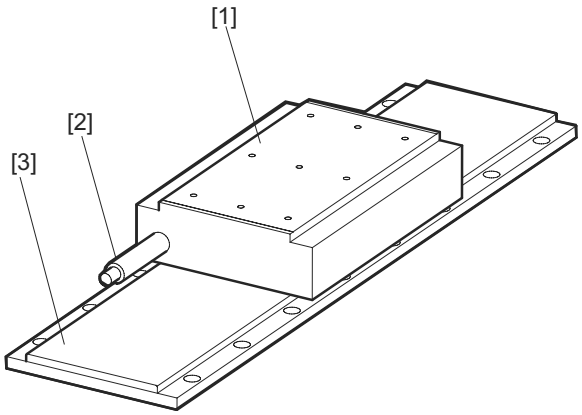

Figure 1: SL2-Basic synchronous linear motor

[1] Primary
[2] Electrical connection in form of a cable extension
[3] Secondary with permanent magnets

SL2-Advance System / SL2-Power System

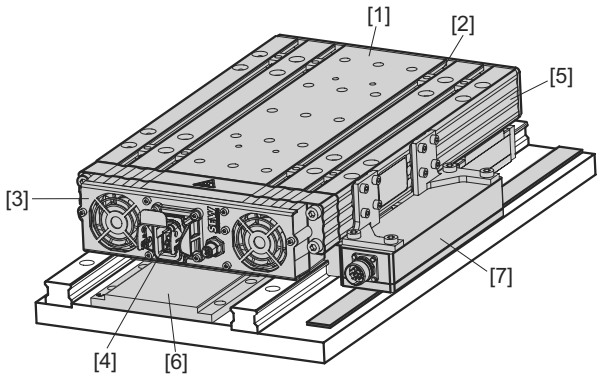

Figure 2: SL2-Advance System and SL2-Power System synchronous linear motor

[1] Optional motor cooling unit
]2[Prepared slots as retaining system for customer setup
[3] Forced cooling fan of optional motor cooling unit
[4] Electrical plug connector
[5] Primary (not visible) installed in motor cooling unit
[6] Secondary
[7] Linear measuring system

3.4 System components for SL2-Advance System and SL2-Power System

System description

The SL2 linear motor is installed into a motor cooling unit at the factory for product groups SL2-Advance System and SL2-Power System.

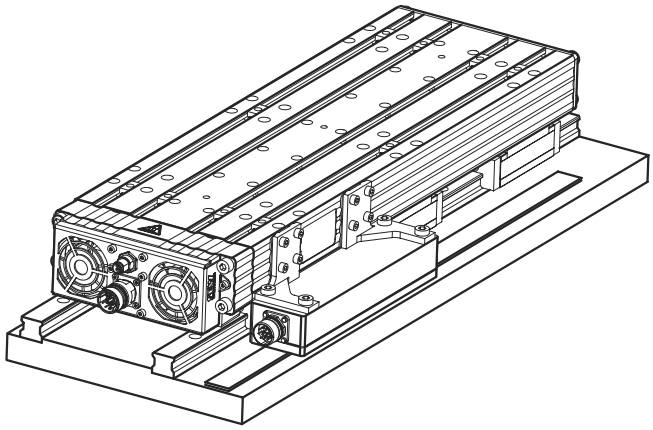

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Figure 3: SL2-Advance System or SL2-Power System with optional linear measuring system AL1H

For motor sizes

- SL2-P050,
- SL2-P100,
- SL2-P150

the motor cooling unit is available for all lengths (except for SL2-P150VS) as system components.

Part drawing of the SL2-Advance System and SL2-Power System

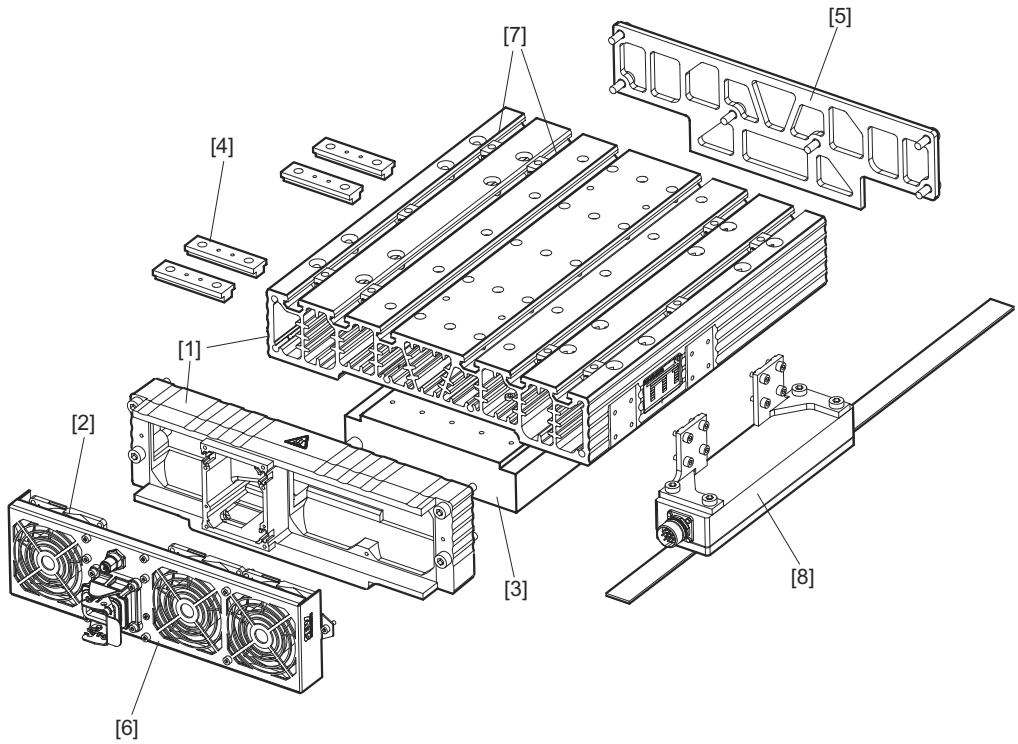

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Figure 4: Motor cooling unit of the SL2-150S Power System

[1] Motor cooling unit
[2] Forced cooling fan (in SL2-Power System only)
[3] Primary
[4] Integrated floating bearing for temperature compensation
[5] End plate
[6] Front panel with power plug and fan guard
[7] Slots for installation of components by customer (T-slot nuts supplied)
[8] Linear measuring system

Design of the subsystems

The motor is installed into the motor cooling unit by SEW-EURODRIVE and connected to a standardized power plug. The 24V power supply for the fans is provided by a separate plug when using forced cooling fans.

Fields of application for the SL2-Power System

The use of the motor cooling unit with forced cooling fans is limited to enclosure IP54.

Fields of application for the SL2-Advance System

The SL2-Advance System can basically be used in all fields of application for the SL2 linear motor. There are no limitations.

For use in hoists!

The motor system is not equipped with its own holding brake. An absolute value measuring system is absolutely necessary when using the system as hoist drive. You will find additional information in section 5 of the "SL2 Synchronous Linear Motors" catalog.

3.5 Type code

The following diagram shows the type code structure.

Primary

SL2 - P 050 VS - 030 - T - B - KVX1 - 490 - 00

Standard / Special design

Winding voltage
DC link voltage 490 V

Cable extension (SL2-Basic)
For more information on the position and length, see the following page (combination overview 1)

or plug connector (SL2-Power System and SL2-Advance System) position, special design, see the following page (combination overview 2)

Motor design
B = SL2-Basic
A = SL2-Advance System
P = SL2-Power System

T = Temperature sensor TF / K = KTY

V_{rated}: 010 = 1 m/s; **030 = 3 m/s**; 060 = 6 m/s

Length of primary
VS = very short
S = short
M = medium
ML = medium long

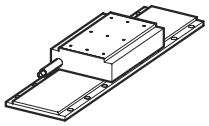
Active width of the primary:
25 mm, 50 mm, 100 mm, 150 mm, 200 mm or 250 mm.

Primary

Second generation of synchronous linear motor

The standard design appears in bold.

Combination overview 1 for SL2-Basic/cable extension



SL2-P...-...-K V X 1-...

Length of cable extension in [m]
1 m = standard
4 m = optional
0 = 0.5 m cable length only for connection version[1)]

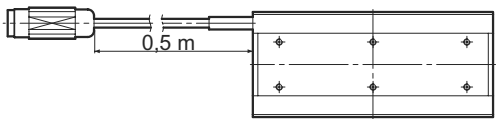
Position of cable outlet
X = standard

Electrical connection
V = connected

K = Cable extension
A = Connector

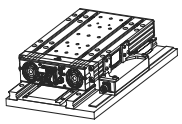
1) Connector version AVXO refers to 0.5 m cable extension with prefabricated connector

- The SL2-Basic version with $I_{rated} \leq 26$ A is available with Intercontec round connector → type AVX0.



- SL2 primaries with a cable length of 2 m are no longer available.

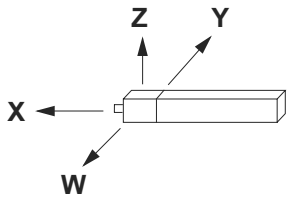
Combination overview 2 for SL2-Advance and SL2-Power System / connector position



SL2-P...-...-S S X S-...

Special design
S = Standard

Position of connector
X = Standard (Y, Z, W)



The following combinations of motor + connector position are not available:
- SL2-050 Power System with connector pos. Z[1)]
- SL2-100 Power System with connector pos.W[1)]
- SL2-150 Power System with connector pos. Z[1)]

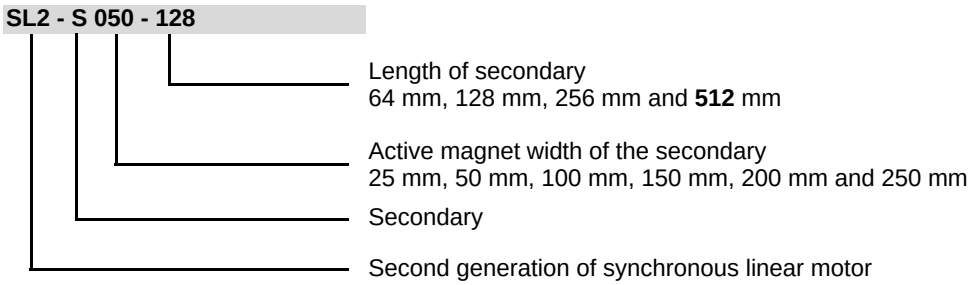
Mechanical design
S = Standard

Connector

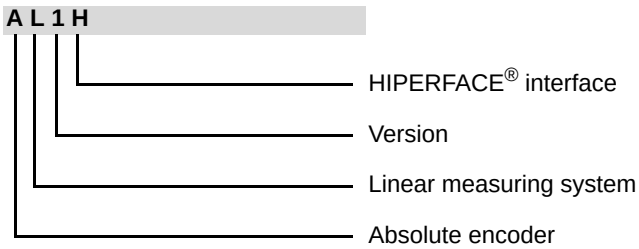
1) Collision with M12 24 V connector

The standard design appears in bold.

Secondary


SL2 - S 050 - 128
Length of secondary
64 mm, 128 mm, 256 mm and **512** mm
Active magnet width of the secondary
25 mm, 50 mm, 100 mm, 150 mm, 200 mm and 250 mm
Secondary
Second generation of synchronous linear motor

Linear measuring system



The standard design appears in bold.

3.6 Nameplate

Labels are attached to the primaries and secondaries that show the technical data as follows:

SL2-Basic nameplate

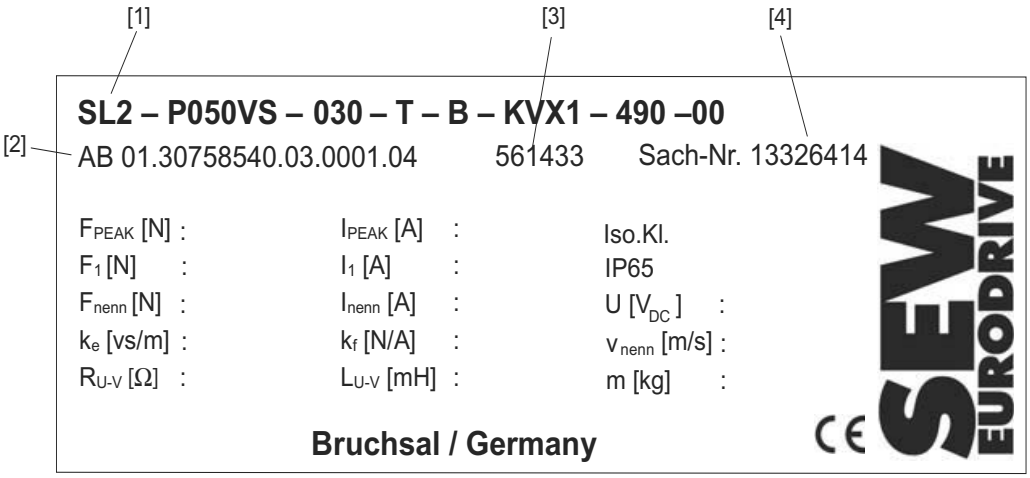


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Figure 5: Nameplate

[1]	=	Type code
[2]	=	Customer order number
[3]	=	Production number
[4]	=	Part number
F_{PEAK}	=	Peak force
F_1	=	Maximum force available up to v_1
F_{nenn}	=	Permanent force
k_e	=	Voltage constant
R_{U-V}	=	Winding resistance
I_{PEAK}	=	Maximum current
I_1	=	Current at F_1
I_{nenn}	=	Rated current
k_f	=	Force factor
L_{U-V}	=	Inductance
Iso.KL.	=	Insulating material class
IP	=	Enclosure
U	=	Voltage
v_{nenn}	=	Velocity up to which the rated force is available
m	=	Weight

SL2-Advance System / SL2-Power System nameplate

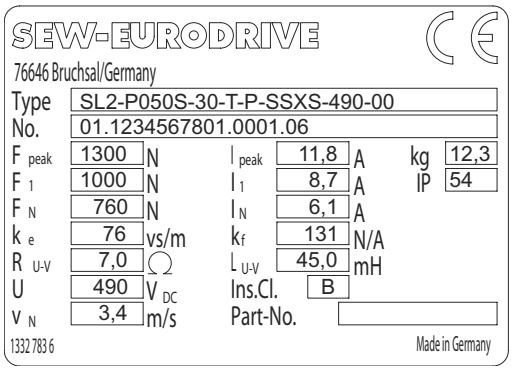

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Figure 6: Nameplate

Type	=	Type code
No.	=	Customer order number
F_{PEAK}	=	Peak force
F_1	=	Maximum force available up to v_1
F_N	=	Permanent force
k_e	=	Voltage constant
R_{U-V}	=	Winding resistance
U	=	Voltage
v_N	=	Velocity up to which the rated force is available
I_{PEAK}	=	Maximum current
I_1	=	Current at F_1
I_N	=	Rated current
k_f	=	Force factor
L_{U-V}	=	Inductance
Ins.Cl.	=	Insulating material class
Part no.	=	Part number
kg	=	Weight
IP	=	Enclosure

Nameplate secondary

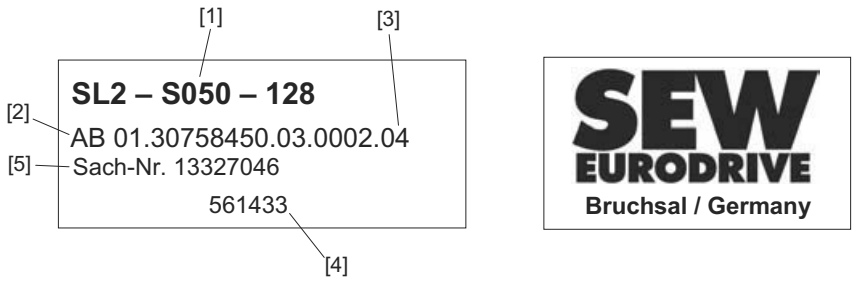

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Figure 7: Nameplate

[1]	=	Type code
[2]	=	Customer order number
[3]	=	Date of production
[4]	=	Production number
[5]	=	Part number

3.7 Scope of delivery of system components

The scope of delivery for SL2 linear motors comprises:

- Primaries
- Secondaries with permanent magnets
- SL2-Advance System
  - Primary installed in motor cooling unit
  - Electrical plug connector
  - T-slot nuts for mounting of customer loads are included
- SL2 Power System
  - Primary installed in motor cooling unit
  - Electrical plug connector
  - Forced cooling fan completely assembled and electrically wired to M12 plug connector
  - T-slot nuts for mounting of customer loads are included
- Prefabricated power and feedback cables
- Control and regulation systems such as MOVIDRIVE®
- Linear measuring system
- Encoder mount-on components

Not included in the scope of delivery:

- Linear guide systems
- Linear measurement systems (except for AL1H)
- Cable carriers
- Brake systems
- Buffer/shock absorber

4 Transportation and Storage

It is essential that you adhere to the safety instructions in the previous sections.

4.1 Transport

SL2-Basic primaries

Primaries of the SL2-Basic

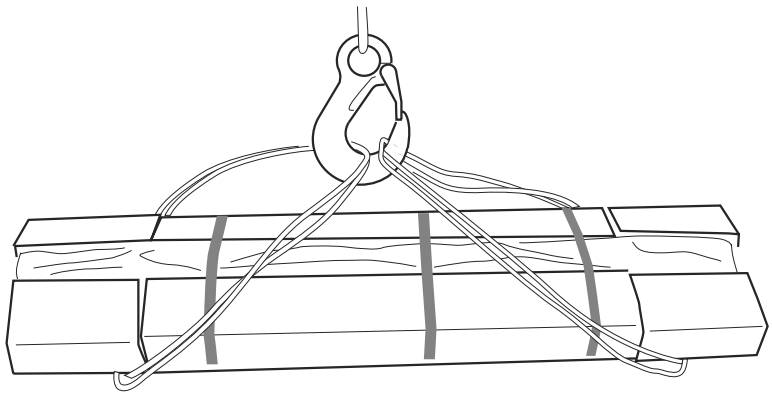
- SL2-P100M/ML
- SL2-P150S/M/ML
- SL2-P200S/M/ML
- SL2-P250VS/S/M/ML

with a net weight of more than 18 kg are equipped with the following transportation aids:

1. Packaged primary

STOP

Transportation of the packaged primary with the attached crane slings only. The weight of the primary is indicated on the nameplate or the dimension sheet.



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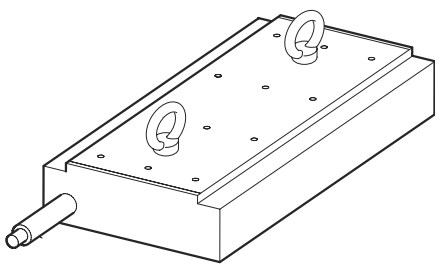
2. Unpacked primary

STOP

The primary is equipped with two M6 threads for transportation with lifting eyebolts (parts not included in scope of delivery) for further transportation or handling.



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SL2-Advance System / SL2-Power System primaries

The primaries of the SL2-Advance Systems / SL2-Power Systems

- SL2-P050M/ML
- SL2-P100S/M/ML
- SL2-P150S/M/ML

with a net weight of more than 18 kg can be removed from the box using a hoist.

1. Unpacked primary

The T-slot nuts on the motor cooling unit are equipped with two M8 lifting eyebolts (parts not included in scope of delivery) for further transportation or handling.

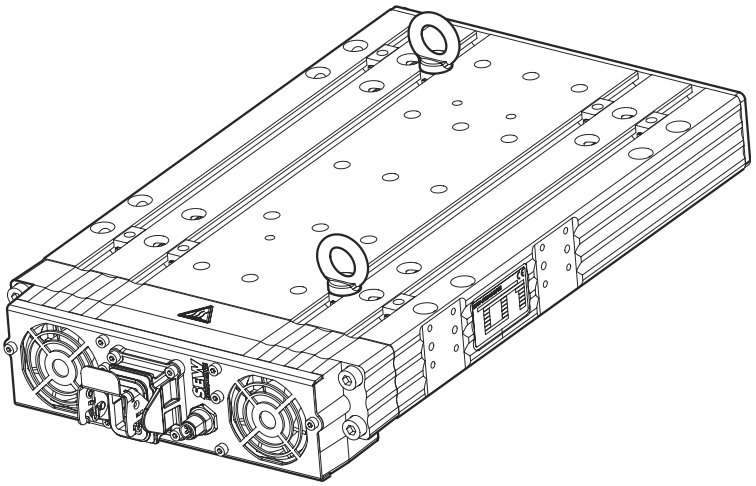

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Figure 8: Transportation of the SL2-Advance System / SL2-Power System

4.2 Packaging

Protective cover must not be damaged since it ensures corrosion protection of metal parts.

Primaries

Primaries of size:

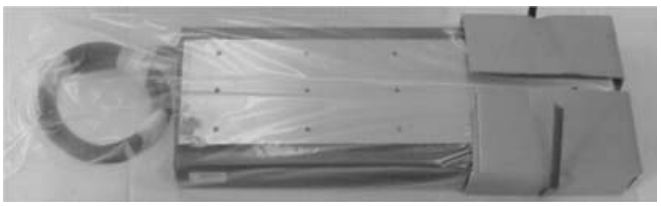
- SL2-P050
- SL2-P100
- SL2-P150

are packaged as follows:

1. Cable extension

53321AXX

2. Bag/corrosion protection



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A bag containing the following information is attached to the motor:

- Safety notes
- Wiring diagram

You must comply with this information.

3. Completely packaged in carton with nameplate

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Primaries of size:

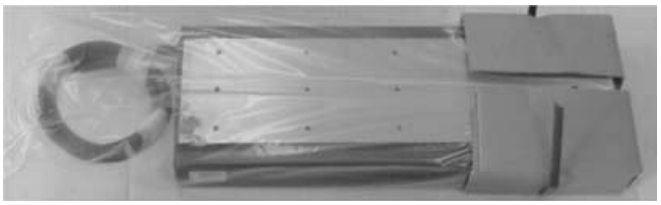
- SL2-P150
- SL2-P200
- SL2-P250

are packaged as follows:

1. Cable extension

53321AXX

2. Bag/corrosion protection



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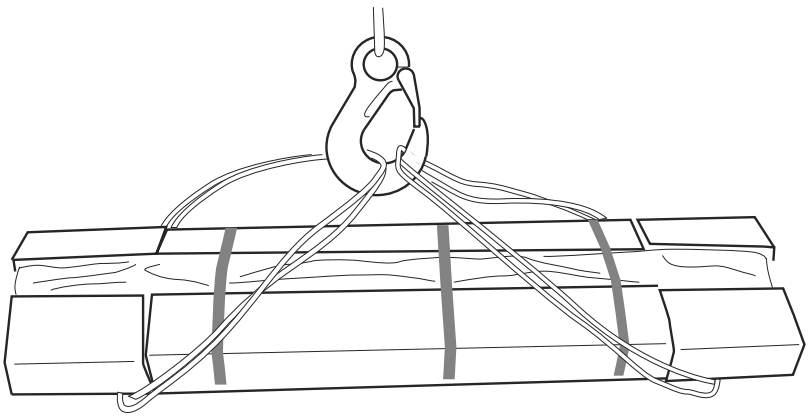
3. Completely packaged in carton with plywood support or transport slings



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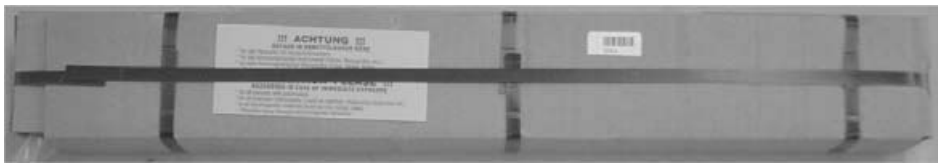
Secondary for all motor types

Protective cover must not be damaged since it ensures corrosion protection of metal parts.

1. Box with packaging straps



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2. Contents secondary box:
   - Secondary packed in protective cover
   - Safety notes and warning labels enclosed loose inside box
   - Touch guard magnetic surface (wooden board)

4.3 Corrosion protection and storage conditions

The motor parts are protected against corrosion for five years in closed original packaging.

Observe the following storage conditions for SL2 linear motors:

- Store the SL2 linear motors inside.
- Keep storage area clean and dry.
- Storage temperature should be between –5 °C and +70 °C.
- Relative humidity not to exceed 95 %
- Original packaging must be free from damages

Stored SL2 linear motors must be equipped with the following warning labels:

- Warning

- Magnetic

4.4 Coating

SL2-Basic The motor parts are coated black matte (EPOXY two-component single coat paint) as standard.

SL2-Advance System / SL2-Power System With the exception of the front area, all motor parts are anodized with a black coating. The front side of the motor is coated with black matte.

4.5 Return delivery to SEW-EURODRIVE

Return primary and secondary components in original packaging only.

Cover the magnetic side of the secondaries with a wooden board (thickness 2 cm) over the entire surface and connect.

5 Mechanical Installation

It is essential that you adhere to the safety instructions in the previous sections.

5.1 Installation tolerances

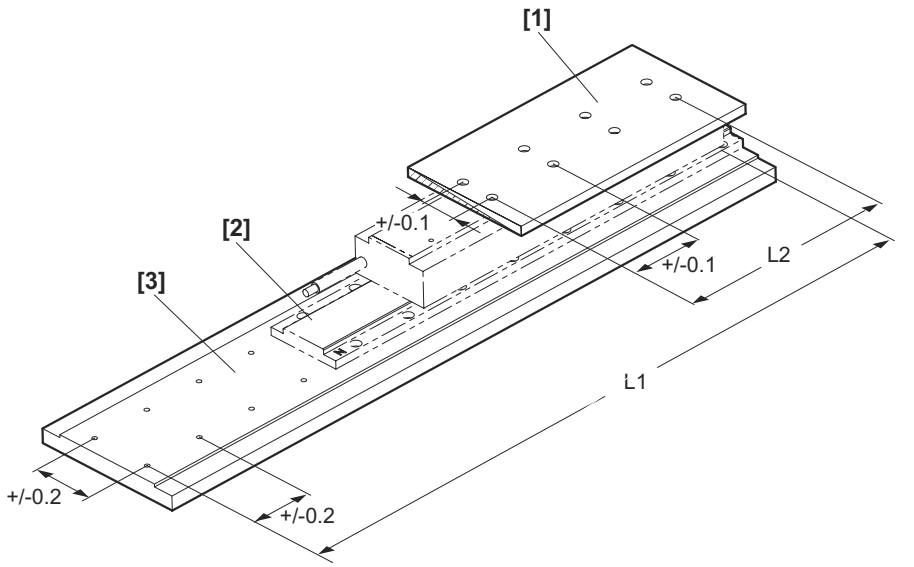

Figure 9: Tolerances

[1] Installation of primary

in reference to the largest primary, max. deflection length / width 0.1 mm

[2] Secondary

in reference to 512 mm length, max. deflection 0.1 mm

[3] Installation of secondary

[L1] ± 0.3 mm in reference to total length

[L2] ± 0.2 mm in reference to total length

The tolerance of the air gap is ±0.05 mm.

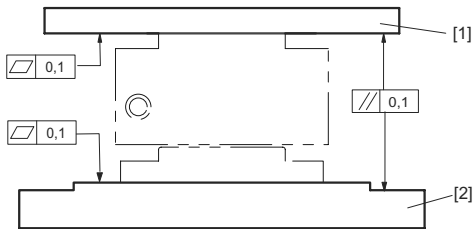

Figure 10: Tolerance of position for entire unit

[1] Installation of primary (mounting plate)
[2] Installation of secondary (basic body, e.g. machine base)

Shape and position tolerances in reference to 1000 mm length

The shape and position tolerances must be observed for the function of the SL2 linear motor. Depending on the used measuring system, it may be necessary to have a greater accuracy of the mounted parts for safe operation. These accuracies are sufficient for the functionality of the AL1H encoder system.

These shape and position tolerances will have to be observed in operating mode at steady-state temperature of the SL2 linear motor. You will also have to take into consideration the influence of the loads installed by the customer.

5.2 Required tools / aids

- Standard tools
- Operation with conductor end sleeves: Crimping tool and conductor end sleeves (without insulation shroud, DIN 46228, Part 1, Material E-Cu)
- Crimping tool for plug connectors

5.3 Installation of the SL2-Basic

Before you begin

Check that

- the information on the nameplate of the drive and/or the output voltage of the servo controller match the voltage supply system,
- the drive is undamaged (no damage caused by transportation or storage)
- it is certain that the following requirements have been met:
  - Ambient temperature between +5 °C and +40 °C[1)]
  - No oil, acid, gas, vapors, radiation, etc.
  - Installation altitude max. 1000 m above sea level.[1)]

Start with the installation of the primary. Install the secondaries after having concluded all other installation work immediately prior to startup of the drive. Observe the safety notes when handling the secondaries (see section 2).

Preparing the SL2-Basic primary for installation

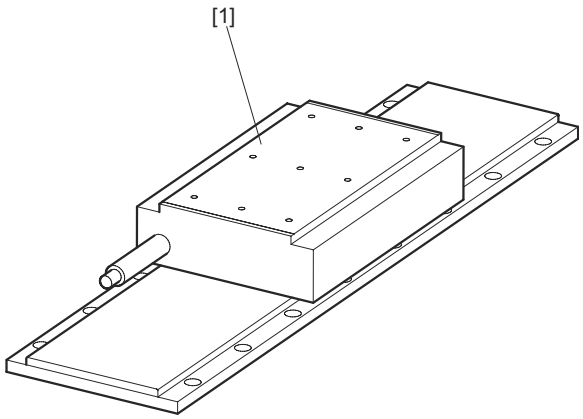

Figure 11: Primary SL2-Basic

Mounting surfaces [1]:

The mouting surfaces of the primary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer. Wipe the surface with a lint free cloth to remove any dust, dirt, etc. clinging to the surface.

Retaining screws:

Use **all** M5 tapped holes in the mouting surface for retaining purposes. Use screws of size M5, strength class 8.8 or higher. The minimum depth of engagement is 8 mm. The tightening torque is always 6 Nm and may not be exceeded, even with screws of a higher strength class.

1) Note the derating data in section 4.9 of the SL2 Synchronous Linear Motor catalog.

5.4 Installation of the SL2-Advance System and SL2-Power System

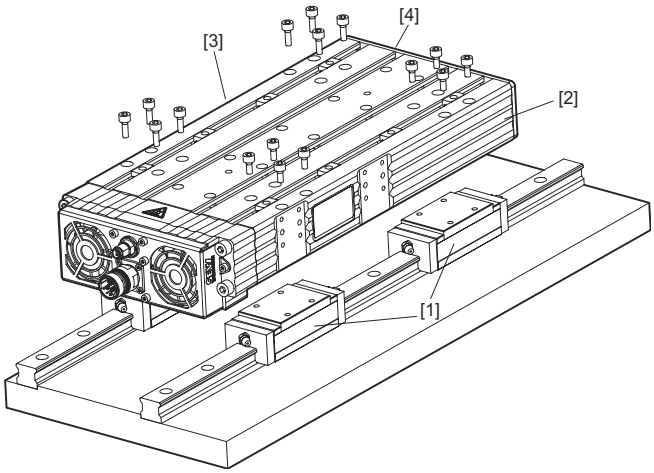

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Figure 12: Installing the primary on the guide system

[1] Guide carriage
[2] Fixed bearing end
[3] Floating bearing end
[4] End plate

The SL2-Advance System and SL2-Power System are screwed onto the guide carriage [1]. Bores for cylinder screws to DIN EN ISO 4762 (previously DIN 912) are provided for this purpose on the primary housing (screws are not included in the scope of delivery).

Guide systems available for SL2-Advance System and SL2-Power System are listed in section 10.7!

This screw connection essentially determines the mechanical load capacity of the primary. Use screws of strength class 8.8 → Sec. 5.7.

Deviating loads of the screw connection must be determined in accordance with the standard calculation procedures used in mechanical engineering (VDI 2230). The customer loads and design of the guide system are included in the calculation.

The calculation basis must not exceed a maximum interface pressure under the screw head of 230 N/mm². The friction value μ_{head} under the screw head is 0.15.

Type		Screw size	Tightening torque [Nm]	Number of screws			
				VS	S	M	ML
SL2-050	Fixed bearing end [2]	M6x12	10	8	8	12	12
	Floating bearing end [3]	M6x16	10	8	8	12	12
SL2-100	Fixed bearing end [2]	M8x16	20	8	8	12	12
	Floating bearing end [3]	M8x20	20	8	8	12	12
SL2-150	Fixed bearing end [2]	M8x16	20		8	8	12
	Floating bearing end [3]	M8x20	20		8	8	12

Prerequisite for assembly

First assemble the guide system including the guide carriage according to the manufacturer's specifications. Note in particular the requirements regarding the accuracy of the mounting surfaces (→ Sec. 5.1 "Installation tolerances")

Starting the installation

Install the secondaries after having concluded all other installation work, immediately prior to startup of the drive. Observe the safety notes when handling the secondaries (see section 2 'Safety Notes').

Installing the primary

1. Wipe the surface of the primary lightly with a lint free cloth to remove any dust, dirt, etc.
2. Align the guide carriages [1] on the guide rails (→ see figure on the previous page) so that the primary can be installed.
3. Mount the guide carriage [1] Use suitable hoists for heavy parts (→ Sec. 2.1 Transportation)
4. Attach all the screws to connect the primary with the guide carriages [1]. Do not grease or oil the screws.

Use a magnetic hexagon socket tool to attach the screws. They prevent screws from falling out in unfavorable mounting positions. If screws fall inside the primary housing, you must remove them. The end plate [4] can be removed for easier access (see illustration on the previous page).

5. First tighten the screws at the fixed bearing end [2] in accordance with the tightening torque (see table on the previous page).
6. Then tighten the screws at the floating bearing end [3].

5.5 Installation of SL2 secondaries

Preparing the secondaries for installation

Caution! Do not unpack parts until you are ready for installation.

Preparing installation of secondaries size 050-200

First prepare the M6 retaining threads in the machine base to install the secondaries.

Preparing installation of secondaries size 250

Parallel pins are additionally needed to install size SL2-S 250. Pin holes with a bore diameter of ∅ 5 H7 mm must be provided in the machine base. Observe a distance tolerance of ± 0.02 mm for the bores.

Use cylinder pins according to ISO 2338-5m6 for securing by pins.

For blind holes we recommend to use parallel pins with internal thread according to DIN 7979-5m6 to facilitate removing the pins in case of disassembly.

The pins must be tightly seated in the borefit to avoid that they loosen during operation of the linear motor. Check for proper pin connection.

The mouting surfaces of the secondary were treated with an anti-corrosion agent at the factory. Do not remove this protection layer. Wipe the surface with a lint free cloth to remove any dust, dirt, etc. clinging to the surface.

Installation of secondaries

Install the first part at one end of the travel distance and work your way down in one direction. The orientation of the first part can be random. The adjoining part will have the same orientation. The north [1] (N) and south [2] (S) poles are identified on the secondaries (→ see following illustration). You can combine secondaries of different lengths.

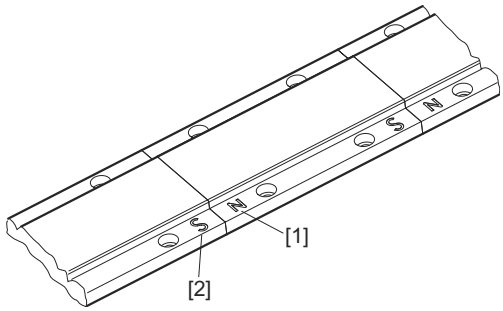


Figure 13: Arrangement of secondaries

[1] North pole
[2] South pole

Use **all** bores of the secondary for retaining purposes. Use screws of size M6, strength class 8.8 or higher. The engagement depth and tightening torque (generally 10 Nm) depend on the customer support structure.

Move primary over secondaries by hand prior to startup of drive to check for unhindered operation.

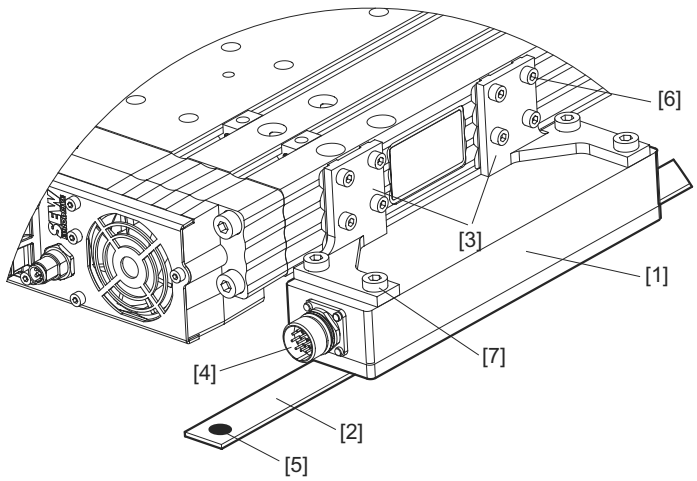
Use non-magnetic testing devices, such as feeler gauges made of stainless steel, aluminum, brass or copper sheets if you are planning to check the visible air gap.

Induced voltages of up to 500 V can be generated by movement of the primary (generator principle) even if the motor is not connected.

Only remove the protection cap on the power plug of the primary immediately before connecting the power plug to the power supply.

5.6 Installation of the AL1H measuring system

- It is essential that you read the manufacturer's operating instructions provided with the encoder system.
- Note for installation of the measuring tape [2] that the end identified by a dot [5] is stuck on in the direction of the connecting plug.



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[1] Linear sensor
[2] Measuring tape
[3] Encoder mount-on components
[4] Connection of the linear sensor
[5] Identification of the installation direction of the measuring tape
[6] Screws for the primary housing/mount-on components
[7] Screws for the linear sensor/mount-on components

Use the M8x20 non-magnetic stainless steel screws provided to connect the linear sensor with the mount-on components [7] → tightening torque 16 Nm.

Tighten the M5x12 screws lightly to connect the primary housing with the mount-on components [6] → maximum tightening torque 5 Nm.

5.7 Mechanical load capacity of the SL2-Advance System and SL2 -Power System

The permitted mechanical load capacity of the entire linear drive system is dependent on the size, position and type of the forces caused by the loads mounted by customers and the permitted loads from:

- Guide system
- Retaining screws for guide carriages on the cooling unit
- Cooling unit housing
- Loads mounted via slots/T-slot nuts

However, to help with the selection, the permitted loads have been reduced to simple applications and clear calculation models. Depending on the individual application, greater loads may occur. If necessary, please contact SEW-EURODRIVE for more information.

Check the previous points in each application.

Guide systems

The detailed project planning process for linear guide system must be performed together with the manufacturer of the guide system and is not the responsibility of SEW-EURODRIVE.

Housing of the motor cooling unit

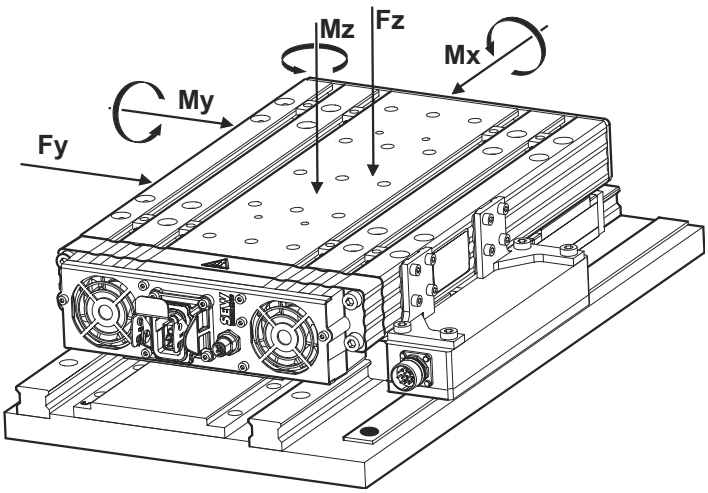

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Figure 14: Static load

[Mx] = permitted load torque on the X axis
[My] = permitted load torque on the Y axis
[Mz] = permitted load torque on the Z axis
[Fy] = permitted force in Y direction
[Fz] = permitted force in Z direction

The table (see below) shows the permitted static loads on the entire primary. The magnetic attraction forces between the primary and secondary are already taken into account.

The values in the following table apply to both directions for the forces and torque ratings.

The housing is only allowed to be subjected to one load value. If several forces/torques act on the housing at the same time, SEW-EURODRIVE can calculate the exact load bearing capacity of the motor cooling unit!

Motor type	Mx [Nm]	Fy [N]	My [Nm]	Fz [N]	Mz [Nm]
SL2-050VS	1500	1600	2500	12000	150
SL2-050S	1700	1800	4500	14000	220
SL2-050M	2500	2800	10000	20000	550
SL2-050ML	2800	3000	16000	20000	800
SL2-100VS	3400	3100	3200	12000	200
SL2-100S	3800	3400	8000	14000	400
SL2-100M	5500	5300	20000	20000	1000
SL2-100ML	5800	5700	32000	20000	1500
SL2-150S	5300	4000	10000	19000	400
SL2-150M	6000	4600	20000	26000	700
SL2-150ML	8500	6500	45000	32000	1800

5.8 Installation of customer components on primary

T-slot nuts are inserted in the primary housing at the factory for the installation of customer components. If required, the distribution of the T-slot nuts within the primary housing can be adapted. To do so, unscrew the end plate [4] (see figure in Sec. 5.4), insert the T-slot nuts in the required slot using a spring and screw the end panel plate on.

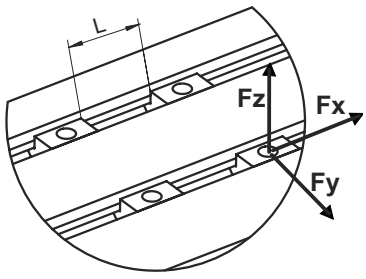

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Figure 15: Minimum distance [L] between the T-slot nuts

The design of the slot system is based on the modular profile system from Bosch/Rexroth so that components from this modular system or similar modular systems can be used.

Permitted static load for the slot:

In direction	Fz	12000 N	(plastic deformation starts)
In direction	Fx	1000 N	
In direction	Fy	1000 N	

The rule of thumb is 1000 N (≈ 100 kg) per T-slot nut in every direction

As long as the minimum distance [L] between the T-slot nuts is observed, the T-slot nuts can be distributed as required within the customer mounting surface.

Motor type	Number of T-slot nuts enclosed	Min. distance (L) between the T-slot nuts [mm]
SL2-050VS	6	70
SL2-050S	8	80
SL2-050M	10	90
SL2-050ML	10	90
SL2-100VS	8	70
SL2-100S	8	80
SL2-100M	10	90
SL2-100ML	10	90
SL2-150S	10	80
SL2-150M	12	90
SL2-150ML	14	90

To make it easier for customers to install/remove loads, each cooling unit comes equipped with pin holes for positioning. Additionally, the T-slot nuts are secured to ensure that they do not shift.

Any other loads acting on the screw connection of the T-slot nuts must be determined in accordance with the standard calculation procedures used in mechanical engineering (VDI 2230). The customer loads and design of the mount-on components are included in the calculation.

Generally, the permitted load of the primary is limited by the screw itself.

6 Electrical installation

It is essential that you adhere to the safety instructions in the previous sections.

Observe the wiring instructions issued by the manufacturer of the servo controller in case motors are powered by inverters. It is essential to observe the operating instructions for the servo controller.

A bag containing the following information is attached to the motor:

- Safety notes
- Wiring diagram

You must comply with this information.

6.1 Electrical connection

SL2-Basic electrical connection

The current carrying capacity only applies to the SL2-Basic design with standard cable length 1m.

Cable extension type	1	2	3	4	5
Outer diameter [mm]	9,6	10,8	13	17,5	20,5
Cores	4 x 1.5 + 1 x (2 x 0.5)	4 x 2.5 + 1 x (2 x 0.5)	4 x 4.0 + 1 x (2 x 0.5)	4 x 6.0 + 1 x (3 x 1.5)	4 x 10 + 1 x (3 x 1.5)
Load at ambient temperature 30 °C [A]	18	26	34	44	61
Load at ambient temperature 40 °C [A]	16	23	30	40	55
Load at ambient temperature 60 °C [A]	12	17	24	31	43
Color of power cores	Black	Black	Black	Black	Black
Identification phase U	1	1	1	U/L1	U/L1
Identification phase V	2	2	2	V/L2	V/L2
Identification phase W	3	3	3	W/L3	W/L3
Color protective earth	Green / yellow	Green / yellow	Green / yellow	Green / yellow	Green / yellow
Color thermistor core (TF1)	White	White	White	Black	Black
Color thermistor core (TF2)	Brown	Brown	Brown	Black	Black
Thermistor identification (TF1) PTC140	-	-	-	1	1
Thermistor identification (TF2) PTC140	-	-	-	2	2
Thermistor identification KTY-84 Anode	White	White	White	1	1
Thermistor identification KTY-84 Kathode	Brown	Brown	Brown	2	2
Minimum bending radius fixed routing [mm]	20	22	26	53	62
Minimum bending radius at constant motion [mm]	96	110	130	175	205

Project planning for cable cross section of the power cable

Cable dimensioning to EN 60402

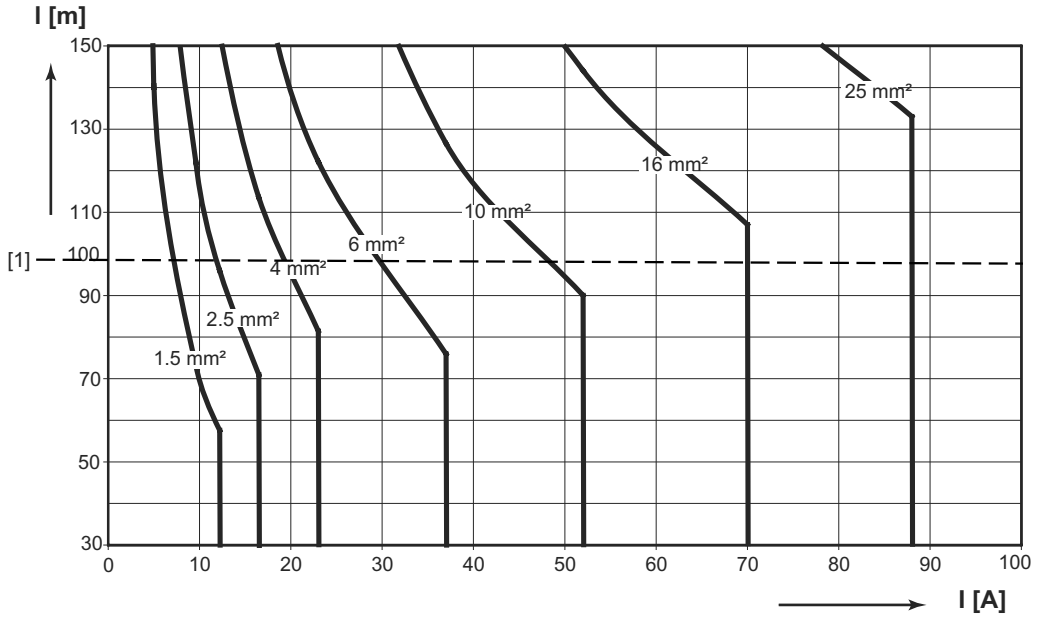

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Figure 16: Minimum required cable cross section depending on cable length l [m] and current I]A[

[1] Max. permitted cable length to SEW specification = 100 m

The diagram (see above) is used as the basis for the cable assignment in sections 10.2 and 10.3.

The hybrid cables with cross sections 1.5 mm^2 to 10 mm^2 can be ordered from SEW-EURODRIVE.

Cable load through current I in [A] according to EN 60204-1 table 5, ambient temperature 40 °C

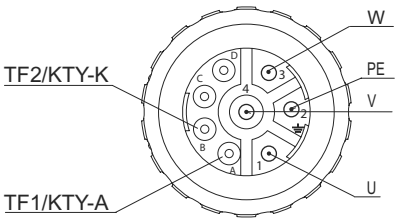
Cable cross section [mm^2]	Three-core sheathed line in pipe or cable [A]	Three-core sheathed line on top of one another on wall [A]	Three-core sheathed cable lined up horizontally [A]
1.5	12.2	15.2	16.1
2.5	16.5	21.0	22
4	23	28.0	30
6	29	36.0	37
10	40	50.0	52
16	53	66.0	70
25	67	84.0	88
35	83	104.0	114

These data are merely recommended values and are **no substitute for detailed project planning** of the supply cables depending on the actual application, taking the applicable regulations into account!

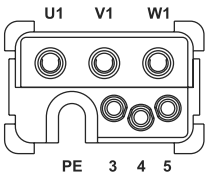
Pin assignment of the power connection for the SL2-Advance System and SL2 - Power System

The following pin assignments are described as viewed onto the motor.

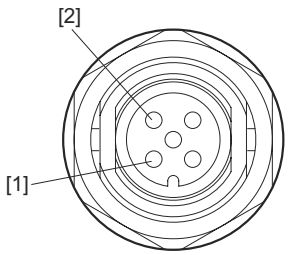
Size SL2-P050 type AVX0

Pin	Assigned	Plug connector
1	U	**BEGA 089** 
4	V	
3	W	
2	PE	
A	TF1/KTY-A	
B	TF2/KTY-K	
C	n.c.	
D	n.c.	

Size SL2-P100, SL2-P150

Pin	Assigned	Plug connector
U1	U1	**C148U connector with socket contacts**
V1	V1	
W1	W1	
PE	Green/yellow	
3	n.c.	
4	(TF1)/KTY-A	
5	(TF2)/KTY-K	

Pin assignment for the power supply to the fan in the SL2-Power System



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[1] +24 V
[2] Ground

Safety notes

EMC measures

SEW-EURODRIVE SL2 synchronous linear motors are designed for use as components for installation in machinery and systems. The designer of the machine or system is responsible for complying with the EMC Directive 89/336/EEC. For more detailed information on this topic, refer to the SEW publications:

"Drive Engineering Practical Implementation Volume 7, Project Planning for Drives" and "Drive Engineering Practical Implementation Volume 9, EMC in Drive Engineering".

Encoder connection

Observe the following instructions when connecting an encoder:

- Use a shielded cable with twisted pair conductors only.
- Connect the shield to the PE potential on both ends over a large surface area.
- Route signal cables separately from power cables or brake cables (min. distance 200 mm).

TF evaluation unit

Risk of unwanted axis movements due to interference from parasitic signals (EMC) via the motor cable.

When synchronous SL2-... linear motors are combined with a MOVIDRIVE® *compact* MCH inverter, SEW-EURODRIVE strongly recommends that you use an external TF evaluation unit (e.g. EMT6-K from Möller or 3RN1011 from Siemens).

If you use the TF evaluation unit in MOVIDRIVE® *compact* MCH (analog input 1 of the connection unit [AI11/AI12 at connector X10]), the TF cable should not be connected for reasons of safety.

During startup, set parameter P835 in the parameter menu to "No response." This ensures that the differential input AI11/AI12 is deactivated.

The evaluation of the external TF evaluation unit is performed separately via the PLC or via an external digital input on the MCH unit (e.g. connection X11, terminal 6 = DI05), which is set to "/Ext. fault" in parameter menu P60 . This measure ensures fault-free and safe operation.

When SL2... linear motors are combined with MOVIDRIVE® B units, the TF can be evaluated directly on the servo controller without any risk of danger.

If you use a KTY temperature sensor (KTY84...140), it is essential that you contact SEW-EURODRIVE.

6.2 Prefabricated cables for SL2-Advance System / SL2-Power System

The cables also have low capacitive properties for operation on inverters (see page 47 and subsequent pages).

Prefabricated power cables

For the motor designs

- SL2 Advance System
- SL2 Power System

SEW-EURODRIVE offers prefabricated power and feedback cables from 1 m to 100 m for straightforward and reliable connection.

The opposite cable end is fitted with cable lugs (for power cables) or conductor end sleeves. The shielding is connected to the mating connector.

Prefabricated power cables are used to connect the:

- Motor power
- Motor protection (**TF** or KTY)

Prefabricated feedback cable

SEW-EURODRIVE offers a feedback cable for the AL1H linear measuring system. The cable is fitted with plug connectors for connection to the encoder and the servo controller.

The cables are only available as cable carrier cables. Cables from the company Nexan are used.

SL2 unit designation

Power cables of the SL2-P050... motors correspond to the brake motor cables of the CM71 motor series with an SB11 round plug connector of the SB71-74 servomotors.

The power cables for the motor sizes SL2-P100 and SL2-P150 correspond to the brake motor cables of the CM motor series with SB51-59 plug connectors.

Structure of power cables for SL2-050 motors

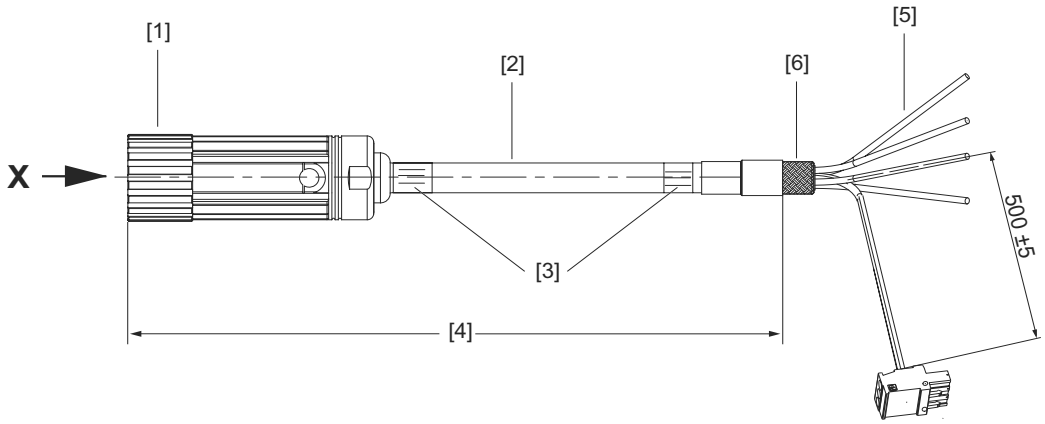

Figure 17: Power cable for SL2-050

[1] Connector: Intercontec BSTA 078
[2] SEW-EURODRIVE logo printed on cable
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2 %
Permitted cable length according to the technical documents
[5] Prefabricated cable end for inverter
Required loose parts are supplied with the cable
[6] Shielding 20 mm, pulled back approximately + 5 mm

Prefabricated cables for motor end

The power cables on the motor end consist of an 8-pin plug connector and socket contacts.

The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

Prefabricated cables for inverter end

The individual cable cores of the power cables are exposed and the shield is prepared for connection in the control cabinet. The cable for the inverter end has yet to be assembled. The loose parts required are supplied with the cable in a separate bag.

Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Contents
1	4 x conductor end sleeves 1.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 1.5 mm^2
2	4 x conductor end sleeves 2.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 2.5 mm^2
3	4 x conductor end sleeves 4 mm^2 , insulated 4 x M6 U-shaped cable lugs 4 mm^2 4 x M10 U-shaped cable lugs 4 mm^2

Structure of power cables for SL2-100 and SL2-150 motors

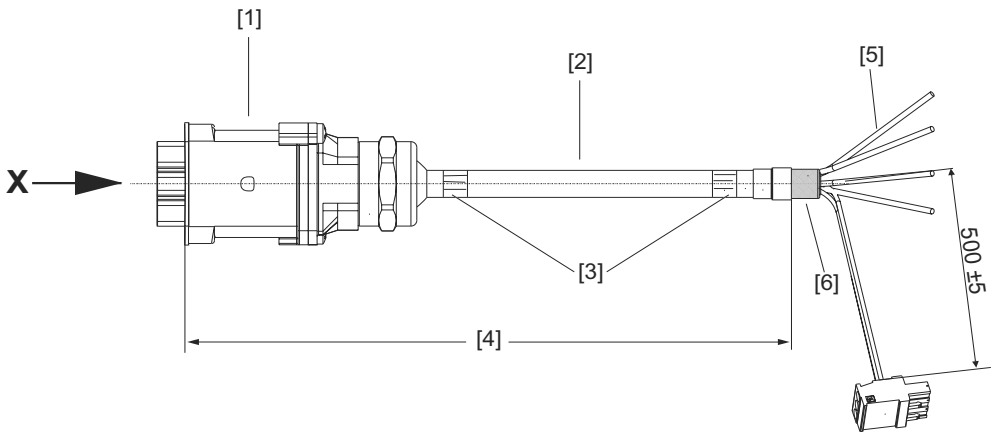

Figure 18: Power cables for SL2-100 and SL2-150 motors

[1] Connector: Amphenol
[2] SEW-EURODRIVE logo printed on cable
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2 %
Permitted cable length according to the technical documents
[5] Prefabricated cable end for inverter
Required loose parts are supplied with the cable
[6] Shielding 20 mm, pulled back approximately + 5 mm

Prefabricated cables for motor end

The power cables on the motor end have a 6-pin EMC Amphenol plug connector and socket contacts.

The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal and ensure cable relief according to EN 61884.

Prefabricated cables for inverter end

The individual cable cores of the power cables are exposed and the shield is prepared for connection in the control cabinet. The cable for the inverter end has yet to be assembled. The loose parts required are supplied with the cable in a separate bag.

Loose parts

The following loose parts are supplied in accordance with the core cross sections for connection to the power terminals on the inverter:

Bag no.	Contents
1	4 x conductor end sleeves 1.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 1.5 mm^2
2	4 x conductor end sleeves 2.5 mm^2 , insulated 4 x M6 U-shaped cable lugs 2.5 mm^2
3	4 x conductor end sleeves 4 mm^2 , insulated 4 x M6 U-shaped cable lugs 4 mm^2 4 x M10 U-shaped cable lugs 4 mm^2
4	4 x M6 U-shaped cable lugs 6 mm^2 4 x M10 U-shaped cable lugs 6 mm^2
5	4 x M6 U-shaped cable lugs 10 mm^2 4 x M10 ring-type cable lugs 10 mm^2

Structure of the AL1H feedback cable for MOVIDRIVE® compact / MOVIDRIVE® B

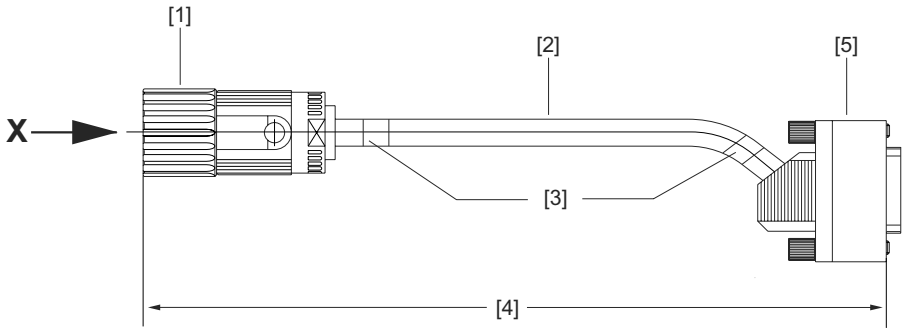

Figure 19: Measuring system plug connector

[1] Connector: Intercontec ASTA
[2] Printed on connector: SEW-EURODRIVE
[3] Nameplate
[4] Cable length ≤ 10 m: Tolerance +200 mm
Cable length ≥ 10 m: Tolerance +2 %
Permitted cable length according to the technical documents
[5] Sub D plug

A 12-pin EMC signal plug connector with socket contacts from Intercontec is used to connect the encoder system. The shield is connected in the connector housing according to EMC requirements. All plug connectors seal the plug on the cable end with a lamellar seal.

Prefabricated cables for inverter end

A commercial sub-D EMC connector with pin contacts is used on the inverter end. A 9-pin or 15-pin connector matching the inverter is used.

Hybrid cable

The outer cable sheath on the motor and inverter end bears a nameplate with part number and logo of the prefabricated cable manufacturer. The ordered length and permitted tolerance are interrelated as follows:

- Cable length ≤ 10 m: Tolerance 200 mm
- Cable length ≥ 10 m: Tolerance +2 %

Refer to the system manual of the inverter for determining the maximum cable length.

Make sure that an EMC-compliant environment is maintained during project planning.

Pin assignment for SL2-050 power cables

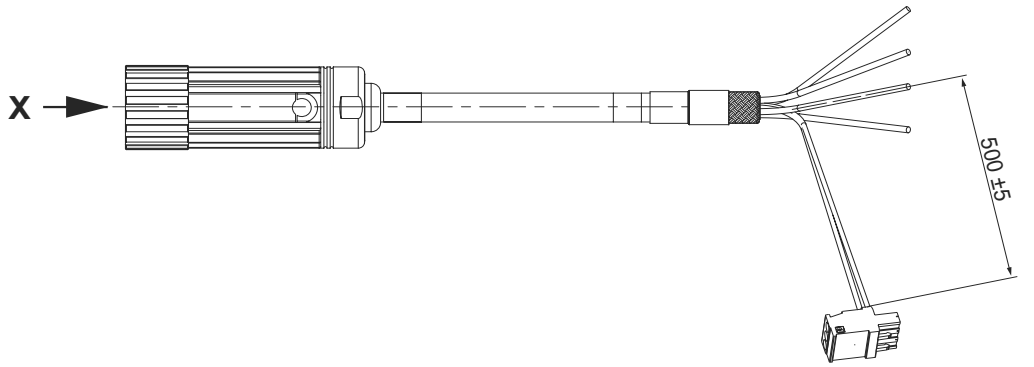

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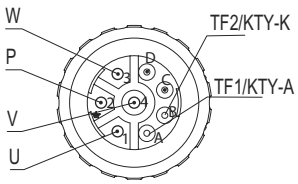
Figure 20: Power cable for SL2-050

The customer assembles the cable with a Phoenix plug connector. The connector can be cut off because it is not required for the TF connection.

Plug connector	Pin	Core identification	Assigned	Contact type	Extra
BSTA 078  **View X**	1	Black with white lettering U, V, W	U		Bag of loose parts
	4		V		
	3		W		
	2	Green / yellow	PE		
	A	Black 1	TF1/KTY-A	Cut off Phoenix connector	
	B	Black 2	TF2/KTY-K		
	C	Black 3	n.c.	Ground in control cabinet	
	D	–	n.c.		

Plug connector type	Number of cores and line cross section	Part no.	Installation type	LC[1)]
SB71 / SB81	**4 x 1.5 mm² (AWG 16)** **3 x 1 mm² (AWG 17)**	0590 613 8	Cable carrier installation	X
SB72 / SB82	**4 x 2.5 mm² (AWG 14)** **3 x 1 mm² (AWG 12)**	0590 632 6	Cable carrier installation	X
SB74 / SB84	**4 x 4 mm² (AWG 12)** **3 x 1 mm² (AWG 17)**	0590 484 6	Cable carrier installation	

1) Cable with low capacity properties (LC = Low capacitiy).

Alternative plug connector at customer end

Plug connectors for power supply with socket contacts (complete).

Type	Number of cores and line cross section	Part no.
SB71 / SB81	**4 x 1.5 mm² (AWG 16)** **3 x 1 mm² (AWG 17)**	0198 919 7
SB72 / SB82	**4 x 2.5 mm² (AWG 14)** **3 x 1 mm² (AWG 12)**	0198 919 7
SB74 / SB84	**4 x 4 mm² (AWG 12)** **3 x 1 mm² (AWG 17)**	0199 163 9

Pin assignment for SL-100 and SL2-150 power cables

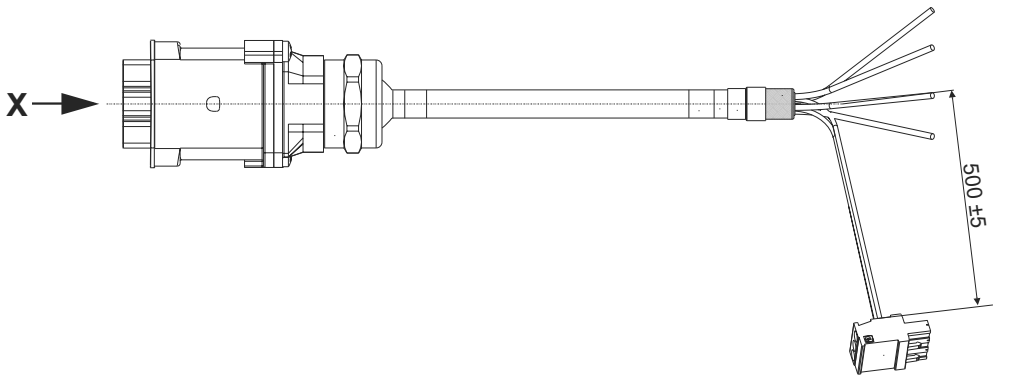


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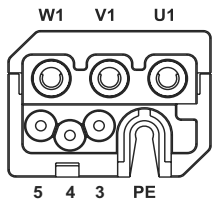
Figure 21: Power cables for SL2-100 and SL2-150

The cable is fitted with a Phoenix plug connector at the control cabinet end. The connector can be cut off because it is not required for the TF connection.

Plug connector	Pin	Core identification	Assigned	Contact type	Extra
C148U connector with socket contacts	U1	Black with white lettering U, V, W	U	Cut-off, length ca. 250 mm	Bag of loose parts
	V1		V		
	W1		W		
 **View X**	PE	Green / yellow	(protective earth)		
	3	Black 1	n.c.	Ground in control cabinet	
	4	Black 2	TF1/KTY-A	Cut off Phoenix connector	
	5	Black 3	TF2/KTY-K		

Power cable types

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type	LC[1)]
SB51 / SB61	**4 x 1.5 mm² (AWG 16) + 3 x 1.0 mm² (AWG 17)**	1333 116 7	Cable carrier installation	X
SB52 / SB62	**4 x 2.5 mm² (AWG 12) + 3 x 1.0 mm² (AWG 17)**	1333 116 5		X
SB54 / SB64	**4 x 4 mm² (AWG 10) + 3 x 1.0 mm² (AWG 17)**	199 194 9		
SB56 / SB66	**4 x 6 mm² (AWG 10) + 3 x 1.5 mm² (AWG 16)**	199 196 5		
SB59 / SB69	**4 x 10 mm² (AWG 10) + 3 x 1.5 mm² (AWG 17)**	199 198 1		

1) Cable with low capacity properties (LC = Low capacitiy).

Pin assignment for SL-100 and SL2-150 power extension cables

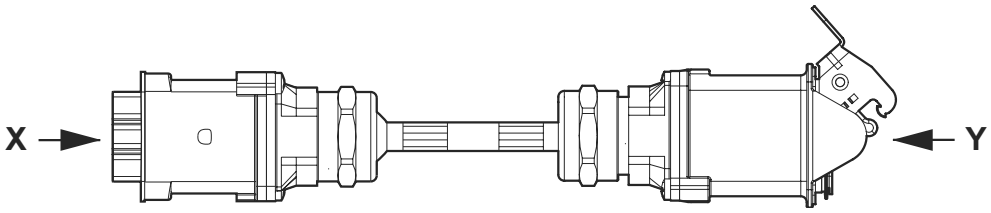


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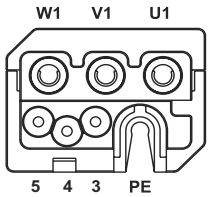
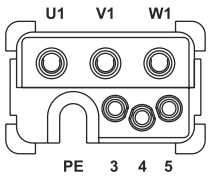
Figure 22: Power extension cables for SL2-100 and SL2-150

Pin assignment for extension cables

Plug connector	Pin	Core identification	Pin	Plug connector
C148U adapter with pin contacts  **View Y**	U1	Black with white lettering U, V, W	U1	**C148U connector with socket contacts**  **View X**
	V1		V1	
	W1		W1	
	PE	Green / yellow	PE	
	n.c.	Black 1	n.c.	
	4 TF1/KTY-A	Black 2	4 TF1/KTY-A	
	5 TF1/KTY-K	Black 3	5 TF1/KTY-K	

The extension cable has the same pin assignment as all other contacts.

Types of power-extension cables

Plug connector type, complete	Number of cores and line cross section	Part number	Installation type	LC[1)]
SK51 / SK61	**4 x 1.5 mm² (AWG 16) + 3 x 1.0 mm² (AWG 17)**	1333 120 5	Cable carrier installation	X
SK52 / SK62	**4 x 2.5 mm² (AWG 12) + 3 x 1.0 mm² (AWG 117)**	1333 121 3		X
SK54 / SK64	**4 x 4 mm² (AWG 10) + 3 x 1.0 mm² (AWG 17)**	0199 204 X		
SK56 / SK66	**4 x 6 mm² (AWG 10) + 3 x 1.5 mm² (AWG 16)**	0199 206 6		
SK59 / SK69	**4 x 10 mm² (AWG 10) + 3 x 1.5 mm² (AWG 17)**	0199 208 2		

1) Cable with low capacity properties (LC = Low capacitiy).

Alternative plug connector at customer end

Plug connectors for power supply with socket contacts (complete).

Type	Cross sections	Part no.
SB51 / SB61	**4 x 1.5 mm² (AWG 16) + 3 x 1.0 mm² (AWG 17)**	199 142 6
SB52 / SB62	**4 x 2.5 mm² (AWG 12) + 3 x 1.0 mm² (AWG 17)**	199 143 4
SB54 / SB64	**4 x 4 mm² (AWG 10) + 3 x 1.0 mm² (AWG 17)**	199 144 2
SB56 / SB66	**4 x 6 mm² (AWG 10) + 3 x 1.5 mm² (AWG 16)**	199 145 0
SB59 / SB69	**4 x 10 mm² (AWG 10) + 3 x 1.5 mm² (AWG 17)**	199 146 9

Cable for AL1H encoders

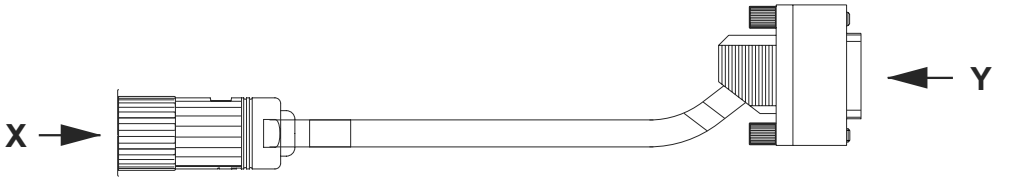


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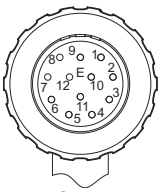
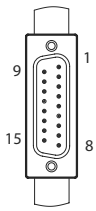
Figure 23: Feedback cable for AL1H encoders

Type	Installation	Part number
SL2	Cable carrier installation (MOVIDRIVE® B)	0595 151 8

Cable pin assignment for feedback cables

Encoder end					Connection MOVIDRIVE® MDX..B	
Plug connector	Contact no.	Description	Cable core color	Description	Contact no.	Plug connector
ASTA021FR **198 921 9** **12-pin with socket contacts**  **View X**	1	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	**Sub-D 15-pin**  MOVIDRIVE® B **View Y**
	2	Data (+)	Black (BK)	Data (+)	4	
	3	Unassigned		Unassigned	3	
	4	Unassigned		Unassigned	5	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	Data (-)	Violet (VT)	Data (-)	12	
	8	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	9	Unassigned		Unassigned	6	
	10	GND	Gray/pink (GY/PK) / pink (PK)	GND	8	
	11	Unassigned		Unassigned	7	
	12	U_S	Gray (GY)	U_S	15	
		Unassigned	Unassigned	Unassigned	11	
		Unassigned	Unassigned	Unassigned	13	
		Unassigned	Unassigned	Unassigned	14	

Extension cable for AL1H encoders

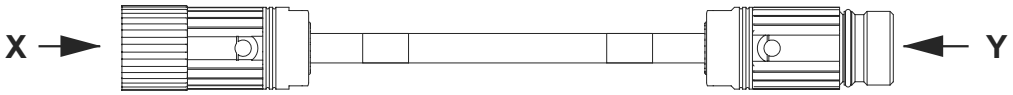


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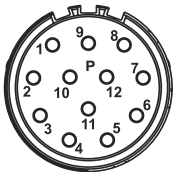
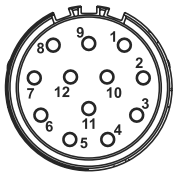
Figure 24: Extension cable for AL1H encoders

The extension cable for AL1H encoders corresponds to the cable types DFS/CFM

Type	Installation	Part number
DFS/CFM	Cable carrier installation	199 540 5

Pin assignment of extension cable for feedback

Pin assignment of extension cable for AL1H encoders						
Plug connector	**Contact no.**	**Description**	**Cable core color**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 673 2** **12-pin with socket contacts**  **View X**	1	The extension cable has the same pin assignment as all other contacts.			1	**AKUA020MR** **199 647 9** **12-pin with pin contacts**  **View Y**
	2				2	
	3				3	
	4				4	
	5				5	
	6				6	
	7				7	
	8				8	
	9				9	
	10				10	
	11				11	
	12				12	

Alternative plug connector at customer end

Plug connectors for power supply with socket contacts (complete).

Type	Cross sections	Part no.
DFS / CFM	**6 x 2 x 0.25 mm^2**	0198 921 9

Cable carrier installation of power cables

Technical specifications of the cable

Installation type		**Cable carrier**				
Cable cross sections		**4 x 1.5 mm² + 3 x 1 mm²**	**4 x 2.5 mm² + 3 x 1 mm²**	**4 x 4 mm² + 3 x 1 mm²**	**4 x 6 mm + 3 x 1.5 mm²**	**4 x 10 mm² + 3 x 1.5 mm²**
Manufacturer		**Nexans**				
Manufacturer designation		PSL(LC)C11Y-J 4x...+3A.../C		PSL11YC11Y-J 4x... +3A.../C		
Operating voltage Vo/	[VAC]	600 / 1000				
Temperature range	[°C]	–20 to + 60				
Max. temperature	[°C]	+ 90 (conductor)				
Min. bending radius	[mm]	150	170	155	175	200
Diameter D	[mm]	15.0 ±1.4	16.2 ±0.7	15.3 ±0.5	17.4 ±0,5	20.5 ±0.5
Maximum acceleration	[m/s²]	20				
Max. velocity	[m/min]	200 at max. travel distance of 5 m				
Core identification		BK with lettering WH + GN/YE				
Sheath color		Orange similar to RAL 2003				
Approval(s)		DESINA / VDE / UL / cULus				
Capacitance core/shielding	[nF/km]	105	105	170	170	170
Capacitance core/core	[nF/km]	65	65	95	95	95
Halogen free		Yes				
Silicone-free		Yes				
CFC-free		Yes				
Inner insulation (cable)		Polyolefin		TPM		
Outer insulation (sheath)		TPU (PUR)				
Flame-inhibiting/self-extinguishing		Yes				
Conductor material		E-Cu blank				
Shielding		Braided tinned Cu shield (optically covered > 85 %)				
Weight (cable)	[kg/km]	280	380	410	540	750

Cable carrier installation of feedback cable:

Technical specifications of the cable

Installation type		**Cable carrier**
Accessory designation		**AL1H / ES1H**
Cable cross sections		**6 x 2 x 0.25 mm^2**
Manufacturer		**Nexans**
Manufacturer designation		SSL11YC11Y6x 2 x 0.25
Operating voltage Vo/	[VAC]	300
Temperature range	[°C]	–20 to + 60
Max. temperature	[°C]	+90 (on conductor)
Min. bending radius	[mm]	100
Diameter D	[mm]	9.8 ± 0.2
Maximum acceleration	[m/s^2]	20
Max. velocity	[m/min]	200
Core identification		WH/BN, GN/YE, GY/PK, BU/RD, BK/VT, GY-PK/RD-BU
Sheath color		Green similar to RAL 6018
Approval(s)		DESINA / UL / VDE / c UL us
Capacitance core/shielding	[nF/km]	100
Capacitance core/core	[nF/km]	55
Halogen free		Yes
Silicone-free		Yes
CFC-free		Yes
Inner insulation (core)		PP
Outer insulation (sheath)		TPE-U
Flame-inhibiting/self-extinguishing		Yes
Conductor material		E-Cu blank
Shielding		Braided tinned Cu
Weight	[kg/km]	130

Power supply for the fan

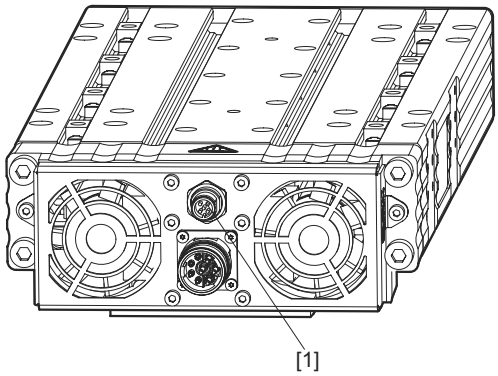


Figure 25: Power supply for the fan

[1] M12 fan connection, 5-pole

The fans in power design are supplied via a commercially available 5-pole, M12 plug connection with DC 24 V.

Customer connection cables are not available from SEW-EURODRIVE.

Suitable connection cables can be ordered from manufacturers, such as:

- Phoenix CONTACT
- Hirschmann
- Harting

.

The following table is an extract from trailing cables available from Phoenix CONTACT:

Sensor/actuator cables, straight M12 socket, 3-pin (suitable for 5-pin connector)

Cable length	Article designation	Article number
3 m	SAC-3P-3,0-PUR/M12FS	16 94 49 9
5 m	SAC-3P-5.0-PUR/M12FS	16 83 51 0
10 m	SAC-3P-10.0-PUR/M12FS	16 93 03 4

7 Startup

SL2-Basic, SL2-Advance System and SL2-Power System are started up in the same way.

7.1 Prerequisites for startup

It is essential that you adhere to the safety instructions in the previous sections.

Before startup, make sure that:

- The primary moves along the entire travel distance easily, without collisions and free from mechanical contact between the primary and secondary
- All connections have been made properly
- All protection devices have been installed correctly
- All motor protection devices are active
- The brake works correctly in hoists
- You have a MOVIDRIVE® with firmware that supports SL2 linear motors.
  (e.g. MOVIDRIVE® MCH xxx -08; MDV xxx -08 or MOVIDRIVE® B MDX...-08)
- There are no other sources of danger present
- The MOVITOOLS® startup software is installed on your PC.

7.2 Commutation travel process

Contrary to rotating systems, there is no mechanical connection between encoder system, primary and secondary in SL2 linear motors.

This connection must be made during startup. The SL2 synchronous linear motor can be controlled directly by the servo controller after initial setup.

This process is referred to as commutation search or commutation travel.

This takes place

- once after "encoder adjustment" for absolute distance measuring systems
- every time the unit is turned on or reset in case of incremental distance measuring systems.

Commutation travel process

1. The SL2 linear motor moves to a random position. This can be a distance of between 0 mm to max. 16 mm in either direction from the start position. The SL2 linear motor stops here for about one second.

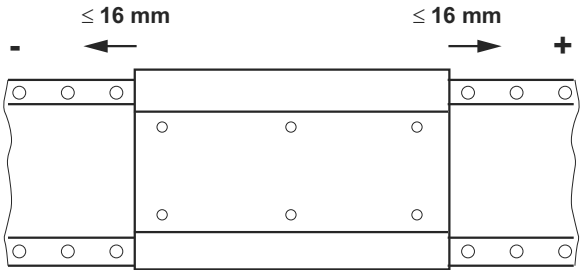


Figure 26: First cycle of the commutation travel

2. The SL2 linear motor is moved by 32 mm in the positive direction. It stops here for about one second.

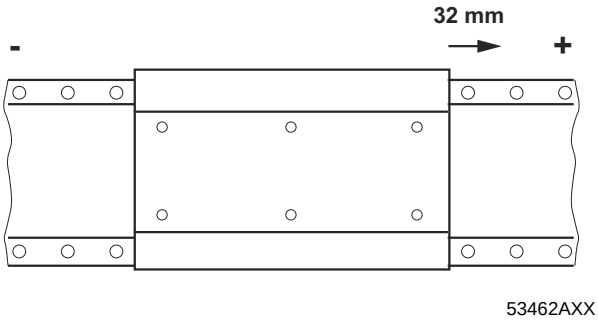


Figure 27: Second cycle of the commutation travel

3. The SL2 linear motor is moved by 32 mm in the negative direction. It stops here for about one second.

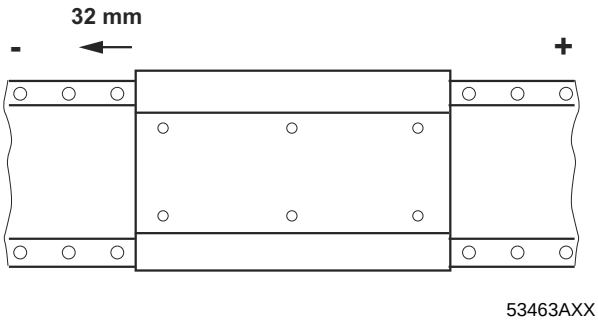


Figure 28: Third cycle of the commutation travel

The SL2 linear motor repeats the cycle if it hits a hardware limit switch. The SL2 linear motor then moves to a new start position, 32 mm away from the limit switch. The cycle restarts.

You will then hear a little cracking noise and the SL2 linear motor switches from controlled to automatic mode.

7.3 Startup procedure

Proceed as follows to do this:

Parameter settings

1. Make sure that the servo controller is in controller inhibit or 24 V mode.
2. Execute startup for linear motor in MOVITOOLS® Shell starting with factory setting.

   Refer to the online help for linear motor startup. Parameter setting is complete once you have pressed the "Download" button twice and the window in Figure 29 is displayed again. Exit the startup window at this point.

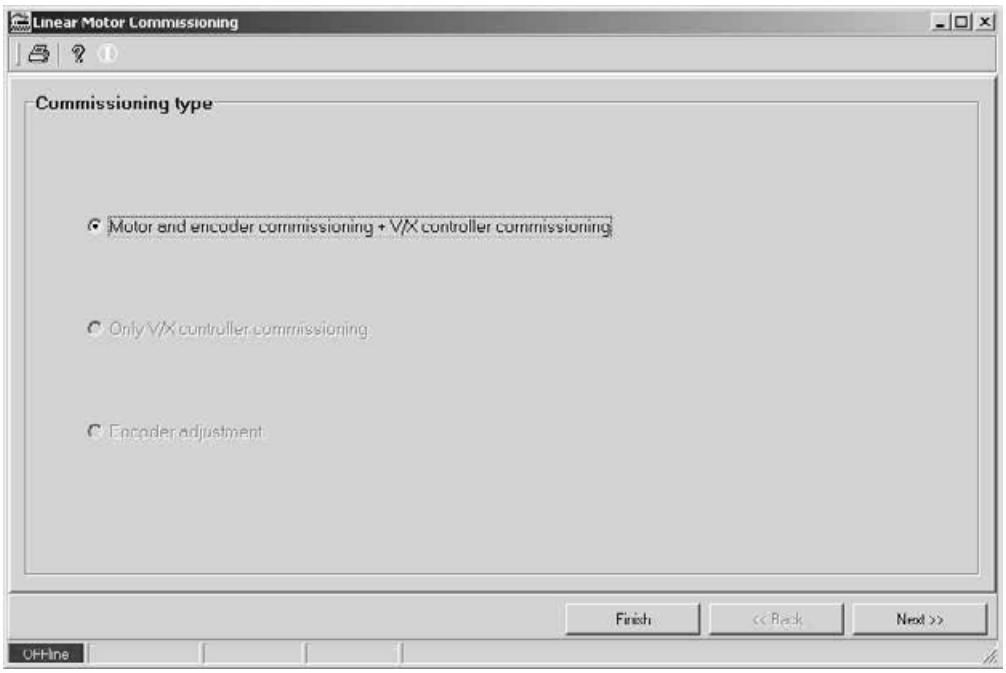


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Figure 29: Main dialog for startup of SL2 linear motors in menu "Startup → SL2 Synchronous linear motors"

Checking encoder evaluation

3. Manually move the primary in one direction and observe parameter P003 (actual position) in MOVITOOLS® Shell. Determine the positive direction of movement. Then slide the SL2 linear motor once over the entire travel distance to check if the encoder works correctly in all areas.

Check hardware limit switches

4. Set the parameters for the hardware limit switch such as in Figure 30 and check their function by manually sliding the primary to the limit switches.

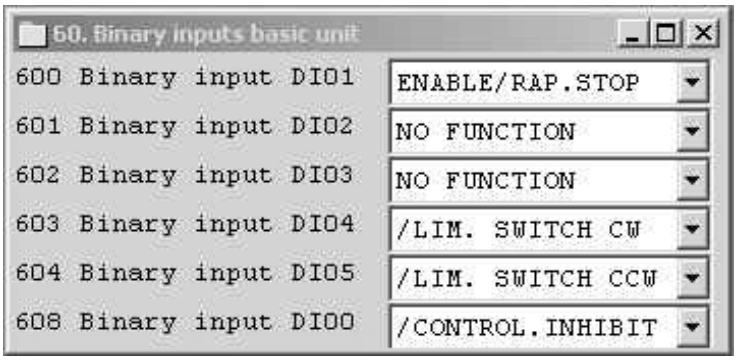

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Figure 30: Binary inputs basic unit

Activate drive limits for initial startup

5. For initial startup limit the maximum speed via parameter P302 (max. speed 1) and the maximum force with parameter P304 (torque limit) so that the motor cannot develop its full force and speed in case of an uncontrolled axis movement.

Do **not** limit the maximum force with parameter P303 (current limit 1) and do **not** limit the maximum speed in the first dialog of the linear motor startup (this is the dialog that appears after Figure 29) because these parameters also affect internal system values.

Commutation travel

6. Deactivate the controller inhibit DI00=1. The SL2 linear motor will now start the commutation sequence described above. See section 7 for troubleshooting of errors that may occur during commutation travel.

Under no circumstances may enable be present during commutation travel!

The variable H458=1 will be automatically set by the servo controller after successful commutation travel. This value will be evaluated by the IPOS$^{plus®}$ program or in the PLC later to permit servo controller enable.

Optimize axis

7. Write a short program to have the SL2 linear motor move cyclically between two positions.

   Start the program and in the linear motor startup (see Figure 29) carry out the point "V/X controller startup only." If the SL2 linear motor moves correctly, set the current and force limits to their original values (see point 5) and optimize the drive control loop via *"Stiffness*" and the button "*Estimate*" (see Figure 31) as you would with rotary servomotors.

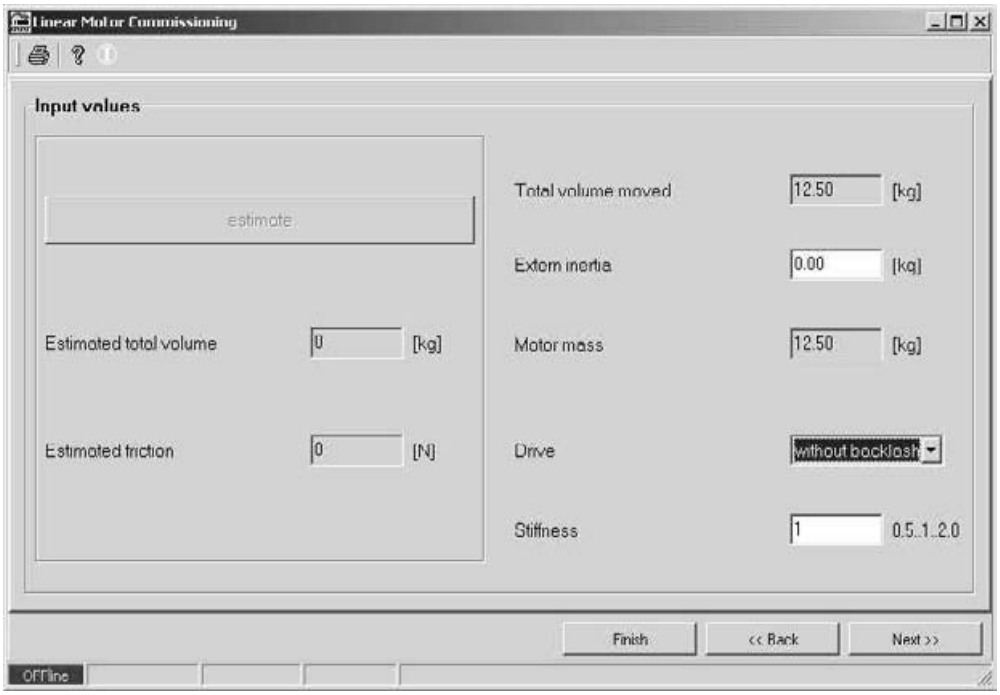

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Figure 31: Screen for optimizing the axis using the "Estimate" button and the "Stiffness" input field

Additional settings

8. With an absolute encoder, you will now execute the menu item "Encoder adjustment". The SL2 linear motor is then ready for operation immediately once the system is turned on. If you do not carry out the menu item "Encoder adjustment", an absolute encoder will behave like an incremental encoder and the SL2 linear motors will carry out a commutation travel once the controller inhibit has been removed and the unit turned on.

9. If you need a different positive encoder counting direction for your linear axis, activate the reversal option for the motor rotation via parameter P350.

10. Remove the TF line from the servo controller with the motor at standstill or enabled to check if the TF monitoring is responding (Error 31; TF trigger).

11. If the drive has an external brake, we recommend that you control it directly. The brake is controlled using parameters P730 - P732.

7.4 Calculating travel parameters

The servo controller and the integrated IPOS$^{plus®}$ sequence control work internally with rotary values. During startup, the program determines conversion factors for linear values to rotary values.

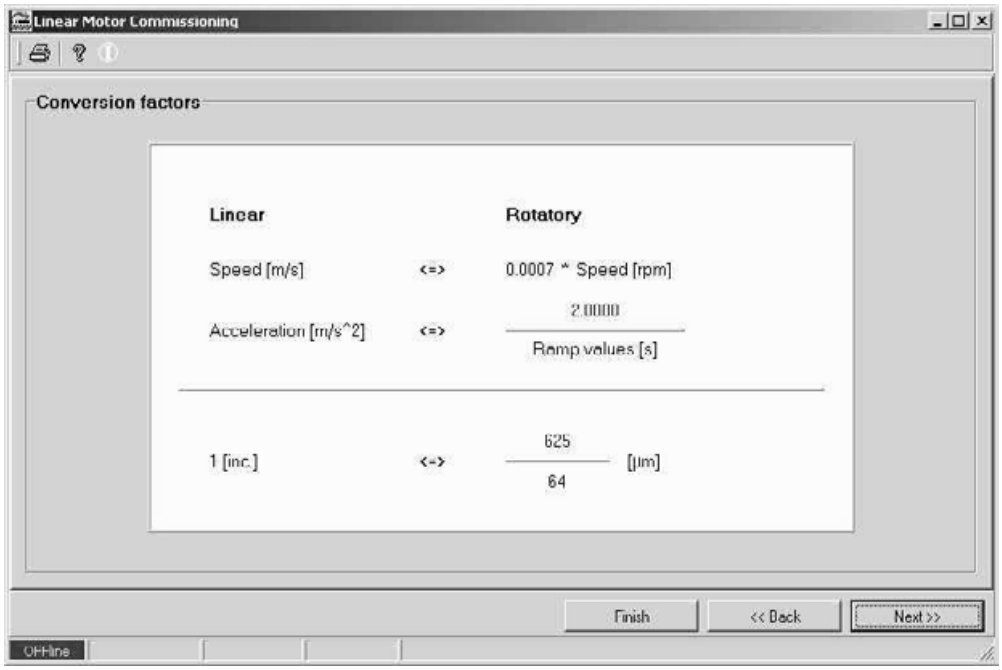

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Figure 32: Conversion factors for SL2-100M-030 with HIPERFACE® encoder displayed at the end of linear motor startup

Example:

An SL2-100M-030 synchronous linear motor with HIPERFACE® encoder is to be operated with the following travel information:

v = 1 m/s

s = 1000 mm

a = 5 m/s^2

Based on the conversion factors shown above, the following rotary information will be displayed in IPOS$^{plus®}$ or via fieldbus:

Speed = 0.0007 / velocity = 1428 1/min

Distance = 64 / 625 × 1000 = 102400 increments

Ramp = 2.000 / 5 = 0.4 sec.

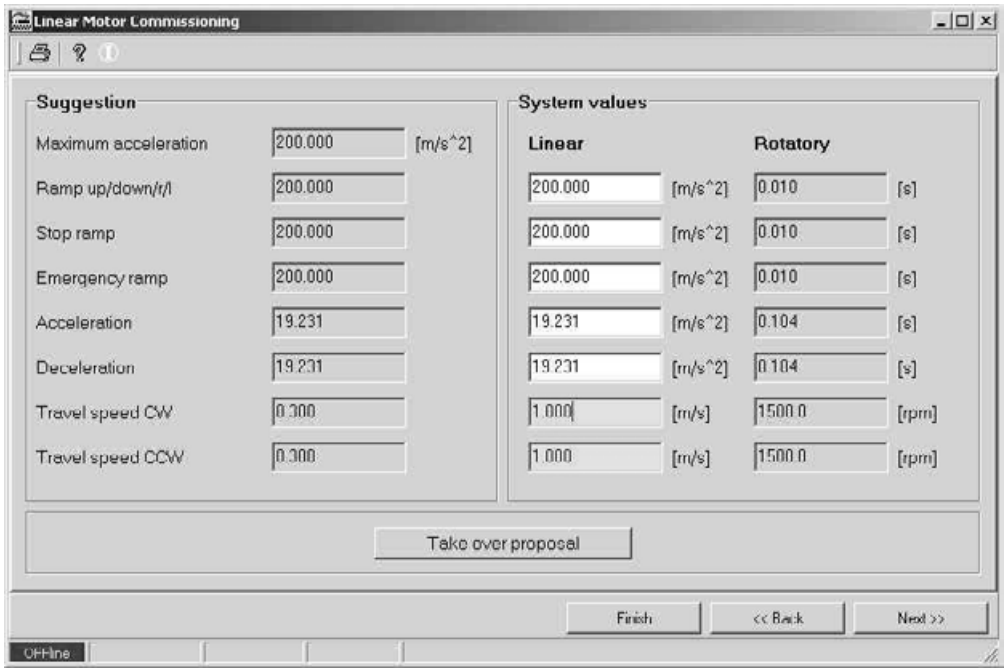

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Figure 33: Dialog in linear motor startup with internal conversion of linear values to rotary values

The values in Figure 32 are rounded off. You can calculate the exact rotary values for IPOS$^{plus®}$ from the linear values in the last screen of the V/X controller startup. In Figure 33 a set speed of 1500 rpm was calculated for IPOS$^{plus®}$ after the positioning velocity 1 m/s was entered.

8 Malfunctions

It is essential that you adhere to the safety instructions in the previous sections.

The servo controller reports malfunctions depending on type via diagnostic LEDs or a 7-segment display and an error code. Consult the system manual or the operating instructions for the respective MOVIDRIVE® for troubleshooting. The following notes offer additional information for troubleshooting especially for SL2 synchronous linear motors.

Faults may be hard to localize if the EMC wiring is not carried out correctly. These are often coupled into the servo controller by the TF lines running in the same duct as the motor cable. We recommend disconnecting the TF for test purposes (set P835 to no response) during commutation travel to exclude this error.

Motor monitoring is off. Make sure that there is no thermal overload at the SL2 linear motor! Otherwise the SL2 linear motor will suffer irreparable damage. Make sure to connect the TF monitoring after successful troubleshooting and set parameter P835 to EMERGENCY STOP / FAULT.

8.1 Problems during commutation search

Fault	Possible cause	Remedy
Encoder error (14) when SL2 linear motor is moved manually	Encoder not installed correctly	Check installation using the encoder manufacturer information: 1. Air gap encoder - measuring tape 2. Alignment encoder - measuring tape 3. with HIPERFACE® encoder: Check mounting direction so that cable output shows in the direction of the smaller absolute values (direction "dot" on the measuring tape if available)
	Encoder not connected correctly	Check pin assignment, operate HIPERFACE® encoder as sin/cos encoder for test purposes
SL2 linear motor does not start after removal of CONTROLLER INHIBIT	Motor cable interrupted	Check linear motor connection
	Brake function P730 = ON	P730 must be set to OFF for commutation search
	(only for HIPERFACE® encoder) servo controller reports that encoder has already been adjusted (H458=1)	If you want to carry out a commutation travel, enter "Encoder adjustment" in the startup dialog; the servo controller will reset the bit automatically in this case
n-monitoring/ lag error during commutation travel	Servo controller not in status "NO ENABLE" because enable is set in addition to CONTROLLER INHIBIT or a terminal has been programmed to "ENABLE"	Assign binary input directly on unit via IPOSplus® control word or via fieldbus with ENABLE, e.g. P603 = ENABLE/ STOP
	EMC problems	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
Encoder error after commutation travel in positive direction (2nd movement)	Counting direction of the encoder does not correspond to U,V,W phase sequence of motor	Check to see if encoder counts positive in the direction that the primary was moving. If not, swap connections of U and W motor cables.
	Resolution of encoder system incorrect/Encoder defective	Slide the SL2 linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS®. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between scanner and measuring tape.
	Current limit reduced too far	Reset P303 to the value set by linear motor startup. Use parameter P304 for force reduction
Encoder error after commutation travel in negative direction (3rd movement)	Travel distances are not identical because axle is mechanically sluggish	Make sure that the drive travels with easy movement for the entire distance and no other forces are at play (process forces, weight forces)
	Travel distances are not identical because encoder is defective	Slide the SL2 linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS®. Adjust the encoder resolution in the linear motor startup, if necessary, and check the distance between scanner and measuring tape.
	Current limit reduced too far	Reset P303 to the value set by linear motor startup. Use parameter P304 to reduce the force.
SL2 linear motor rotates too far	EMC problems	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Defective spot in linear scale	Slide the SL2 linear motor for a defined distance and check whether the displayed increments correspond to the calculated value using the calculation displayed by MOVITOOLS®. Perform checks at several spots and check the distance between scanner and measuring tape.

8.2 Problems during operation

Fault	Possible cause	Remedy
SL2 linear motor does not start	Motor cable interrupted	Check motor connection
	Brake does not release	Check brake control; check air supply for pneumatic brakes
SL2 linear motor makes humming noise or does not run smoothly	Fault on encoder cable	See system manual and volume 9 Practical Drive Engineering. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Controller parameters set incorrectly	Perform startup of control loop once again
	Encoder connection with primary not rigid enough	Check to see if mechanical connection between encoder and primary is rigid enough.
	Permitted operating temperature of encoder exceeded	• Select the travel cycle so that the effective value of the output current is less than the rated current of the motor • Arrange for better heat dissipation of primary • Decouple encoder thermally (mounting with plastic distance plate) • Use encoder system with higher permitted operating temperature
SL2 linear motor heats up excessively	Overload	Select the travel cycle so that the effective value of the output current is less than the rated current of the motor
	Insufficient cooling	Improve cooling or install fan
	Air gap too large, resulting in power loss at same current (see derating table in catalog)	Adjust air gap
	Ambient temperature is too high	Select travel cycle so that effective value of output current is less than rated current of SL2 linear motor
HIPERFACE® encoder fault	Problems on encoder cable	If the problems do not occur during manual sliding, they are often caused by problems in the encoder or TF line. Consult the system manual or volume 9 of Practical Drive Engineering for troubleshooting. Check for correct shielding, equipotential bonding and observe the note at the beginning of this section
	Encoder not installed correctly	Check installation using the encoder manufacturer information: 1. Air gap encoder - measuring tape 2. Alignment encoder - measuring tape 3. with HIPERFACE® encoder: Check mounting direction so that cable output shows in direction smaller absolute values (direction "dot" on the measuring tape if present) Check rigidity of encoder mounting. Observe the manufacturer tolerances even with fast accelerations.

9 Inspection and Maintenance

It is essential that you adhere to the safety instructions in the previous sections.

- Use only genuine spare parts in accordance with the valid parts list!
- Motors can become very hot during operation – danger of burns!
- Disconnect the SL2 linear motor from the power supply before starting work and protect it against unintentional re-start!

9.1 General maintenance work

The primaries and secondaries are maintenance-free and cannot be repaired. Replace defective parts.

Remove any traces of dirt, chips, dust, etc. from the secondaries with a soft cloth.

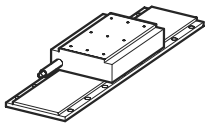
Note that mobile cables are subject to wear. They have to be checked for external changes on a regular basis.

9.2 Additional maintenance for Power version

Keep air entry screen on fans free from congestion.

10 Technical Data

10.1 SL2-Basic motor data



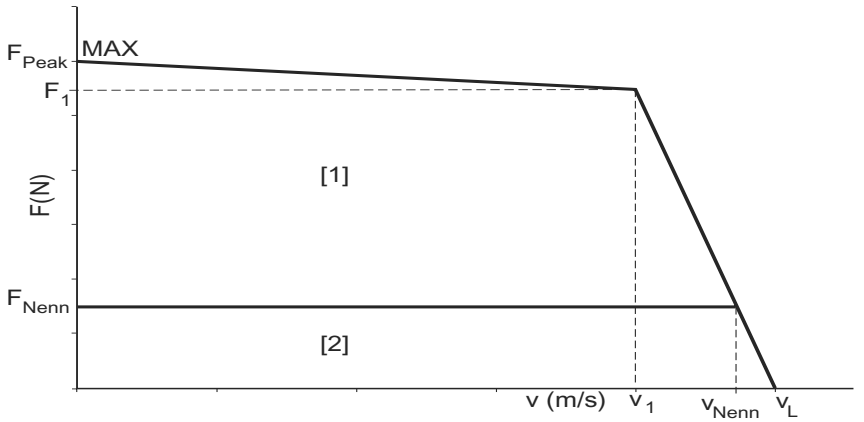


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Figure 34: Characteristic curve

[1] = Dynamic limit forces
[2] = Thermal limit forces
F_{rated} = Permanent force
when mounting to a horizontal aluminum cooling surface with
- **four times primary flange surface**
- **10 mm thickness**
- **up to an ambient temperature of 40°C**
- **an installation altitude of up to 1000 m**

F_1 = Maximum force available up to v_1
F_{Peak} = Maximum force
v_L = Theoretical maximum traveling velocity
v_1 = Velocity up to which force F_1 is available
v_{rated} = Velocity up to which the rated force is available
I_{rated} = Rated current
I_1 = Current at F_1
I_{Peak} = Maximum current
F_D = Force through magnetic attraction

Motor type	Force				Velocity		Current			Cable cross section[1)]
	F_{Peak} [N]	F_1 [N]	F_{rated} [N]	F_D [N]	v_1 [m/s]	v_{rated} [m/s]	I_{Peak} [A]	I_1 [A]	I_{rated} [A]	[mm]
SL2-025VS	330	240	125	750	3	3.2	3.0	2.0	0.95	3 x 1.5
SL2-025VS	330	225	125	750	6	6.8	6.0	4.0	2.0	3 x 1.5
SL2-025S	650	470	240	1450	1.5	1.6	3.0	1.95	0.9	3 x 1.5
SL2-025S	650	460	240	1450	3	3.2	6.0	3.9	1.8	3 x 1.5
SL2-050VS	650	500	280	1480	- 3 6	- 3.4 8.0	- 6.0 13.9	- 4.4 10.3	- 2.2 5.3	 3 x 1.5 3 x 1.5
SL2-050S	1300	1000	560	2880	1 3 6	1.3 3.4 6.9	4.8 11.8 24.5	3.5 8.7 17.8	1.8 4.5 9.0	3 x 1.5 3 x 1.5 3 x 1.5
SL2-050M	1950	1500	840	4300	1 3 6	1.1 3.3 6.4	5.9 18.0 33.0	4.4 12.8 24.6	2.2 6.5 12.6	3 x 1.5 3 x 1.5 3 x 1.5
SL2-050ML	2600	2000	1120	5700	1 3 6	1.1 3.4 6.9	7.8 24.0 48.0	5.8 17.8 35.5	2.9 9.1 18.2	3 x 1.5 3 x 1.5 3 x 2.5

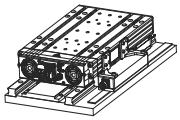
Motor type	Force				Velocity		Current			Cable cross section[1]
	F_{Peak} [N]	F_1 [N]	F_{rated} [N]	F_D [N]	v_1 [m/s]	v_{rated} [m/s]	I_{Peak} [A]	I_1 [A]	I_{rated} [A]	[mm]
SL2-100VS	1325	1000	600	2950	1 3 6	1.1 3.8 6.9	4.8 14.2 24.6	3.4 10.3 17.8	1.9 5.6 9.7	3 x 1.5 3 x 1.5 3 x 1.5
SL2-100S	2650	2000	1200	5760	1 3 6	1.1 3.4 6.9	8.0 25.0 49.0	5.8 17.8 35.5	3.1 9.7 20	3 x 1.5 3 x 1.5 3 x 2.5
SL2-100M	3970	3000	1800	8570	1 3 6	1.3 3.2 6.9	14.2 35.0 75.0	10.3 24.6 53.3	5.6 13.5 29.2	3 x 1.5 3 x 1.5 3 x 4.0
SL2-100ML	5300	4000	2400	11380	1 3 6	1.1 3.4 7.0	16.0 49.0 100.0	11.5 35.5 74.4	6.3 19.5 40.7	3 x 1.5 3 x 2.5 3 x 6.0
SL2-150VS	2000	1500	900	4420	1 3 6	1.1 3.3 6.4	6.1 18.0 35.0	4.4 12.8 24.6	1.9 7.0 13.5	3 x 1.5 3 x 1.5 3 x 1.5
SL2-150S	3900	3000	1800	8640	1 3 6	1.1 3.2 6.4	12.0 33.5 67.0	8.7 24.5 49.0	4.8 13.5 27.0	3 x 1.5 3 x 1.5 3 x 4.0
SL2-150M	5800	4500	2700	12860	1 3 6	1.1 3.4 6.4	18.0 53.0 100.0	13.1 39.0 74.5	7.2 21.5 40.7	3 x 1.5 3 x 2.5 3 x 6.0
SL2-150ML	7700	6000	3600	17000	1 3 6	1.1 3.7 6.4	24.0 76.0 132.0	17.4 56.7 98.0	9.4 31.0 53.8	3 x 1.5 3 x 4.0 3 x 6.0
SL2-200VS	2700	2000	1260	5900	1 3 6	1.1 3.4 7.6	8.1 25.0 55.0	5.7 17.8 39.2	3.3 10.2 22.5	3 x 1.5 3 x 1.5 3 x 2.5
SL2-200S	5200	4000	2520	11520	1 3 6	1.1 3.4 7.2	15.6 48.2 101	11.5 35.5 74.4	6.6 20.4 42.7	3 x 1.5 3 x 2.5 3 x 6.0
SL2-200M	7800	6000	3780	17150	1 3	1.1 3.4	23.4 72.0	17.2 53.3	9.9 30.1	3 x 1.5 3 x 4.0
SL2-200ML	10350	8000	5040	22780	1 3	1.1 3.6	30.6 100.0	22.7 74.4	13.0 42.8	3 x 1.5 3 x 6.0
SL2-250VS	3170	2400	1500	7370	1 3 6	1.2 3.5 6.6	10.0 30.0 57.0	7.3 21.8 41.2	4.1 12.4 23.5	3 x 1.5 3 x 1.5 3 x 2.5
SL2-250S	6300	4800	3000	14400	1 3 6	1.1 3.3 6.6	18.7 57.0 113.0	13.6 41.2 82.4	7.8 23.5 47.0	3 x 1.5 3 x 4.0 3 x 6.0
SL2-250M	9450	7200	4500	21430	1 3	1.1 3.5	30.0 90.0	21.8 65.0	12.4 37.2	3 x 1.5 3 x 6.0
SL2-250ML	12600	9600	6000	28450	1 3	1.1 3.3	37.0 113.0	27.2 82.5	15.5 47.0	3 x 1.5 3 x 6.0

1) Cable cross section on SL2-Basic primary (for configuration of cable cross sections for the inverter, see section 6.1)

Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

For inverter assignment, see section 10.4.

10.2 SL2-Advance System motor data



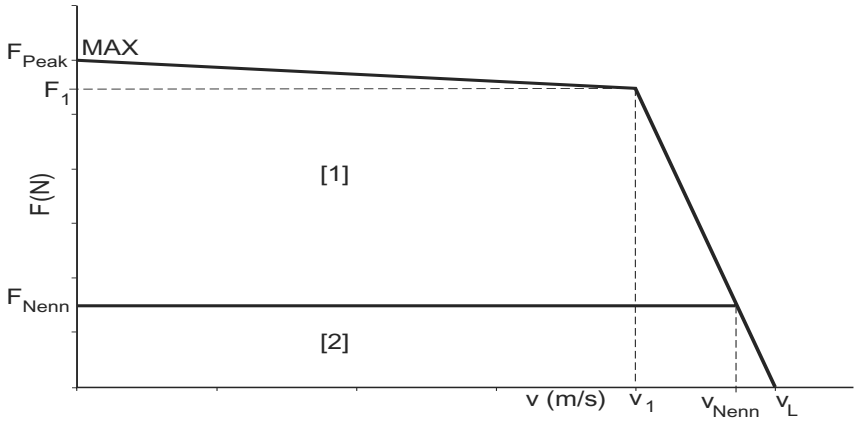


Figure 35: Characteristic curve

[1] = Dynamic limit forces
[2] = Thermal limit forces
F_{rated} = Permanent force

Rated characteristics refer to operation at
- **an ambient temperature of 40 °C**
- **an installation altitude of up to 1000 m**

F_1 = Maximum force available up to v_1
F_{Peak} = Maximum force
v_L = Theoretical maximum traveling velocity
v_1 = Velocity up to which force F_1 is available
v_{rated} = Velocity up to which the rated force is available
I_{rated} = Rated current
I_1 = Current at F_1
I_{Peak} = Maximum current
F_D = Force through magnetic attraction

Motor type	Force				v_1	Current			Cable cross section	To cable length s	Part no. cable	Cable cross section	To cable length s	Part no. cable
	F_{Peak}	F_1	F_{rated}	F_D		I_{Peak}	I_1	I_{rated}						
	[N]				[m/s]	[A]			[mm²]	[m]		[mm²]	[m]	
SL2-050VS	650	500	280	1480	- 3 6	- 6.0 13.9	- 4.4 10.3	- 2.2 5.3	1.5 1.5	100 100	0590 481 1 0590 481 1			
SL2-050S	1300	1000	560	2880	1 3 6	4.8 11.8 24.5	3.5 8.7 17.8	1.8 4.5 9.0	1.5 1.5 1.5	100 100 57	0590 481 1 0590 481 1 0590 481 1	2.5	100	0590 483 8
SL2-050M	1950	1500	840	4300	1 3 6	5.9 18.0 33.0	4.4 12.8 24.6	2.2 6.5 12.6	1.5 1.5 2.5	100 100 71	0590 481 1 0590 481 1 0590 483 8	4.0	100	0590 484 6
SL2-050ML	2600	2000	1120	5700	1 3 6	7.8 24.0 48.0	5.8 17.8 35.5	2.9 9.1 18.2	1.5 1.5 4.0	100 57 100	0590 481 1 0590 481 1 0590 484 6	2.5	100	0590 483 8
SL2-100VS	1325	1000	600	2950	1 3 6	4.8 14.2 24.6	3.4 10.3 17.8	1.9 5.6 9.7	1.5 1.5 1.5	100 100 57	0199 190 6 0199 190 6 0199 190 6	2.5	100	0199 192 2
SL2-100S	2650	2000	1200	5760	1 3 6	8.0 25.0 49.0	5.8 17.8 35.5	3.1 9.7 20	1.5 1.5 4.0	100 57 100	0199 190 6 0199 190 6 0199 194 9	2.5	100	0199 192 2
SL2-100M	3970	3000	1800	8570	1 3 6	14.2 35.0 75.0	10.3 24.6 53.3	5.6 13.5 29.2	1.5 2.5 6.0	100 71 100	0199 190 6 0199 192 2 0199 196 5	4.0	100	0199 194 9
SL2-100ML[1)]	5300	4000	2400	11380	1 3	16.0 49.0	11.5 35.5	6.3 19.5	1.5 4.0	100 100	0199 190 6 0199 194 9			
SL2-150S	3900	3000	1800	8640	1 3 6	12.0 33.5 67.0	8.7 24.5 49.0	4.8 13.5 27.0	1.5 2.5 6.0	100 71 100	0199 190 6 0199 192 2 0199 196 5	4.0	100	0199 194 9
SL2-150M	5800	4500	2700	12860	1 3 6	18.0 53.0 100.0	13.1 39.0 74.5	7.2 21.5 40.7	1.5 4.0 10.0	100 82 100	0199 190 6 0199 194 9 0199 198 1			
SL2-150ML	7700	6000	3600	17000	1 3 6	24.0 76.0 132.0	17.4 56.7 98.0	9.4 31.0 53.8	1.5 6.0 10.0	57 77 90	0199 190 6 0199 196 5 0199 198 1[2)]	2,5 10,0	100 100	0199 192 2 0199 198 1

1) SL2-100ML is not available in speed class 6 m/s.

2) Maximum permitted load on cable is 51.6 A

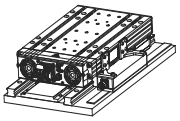
Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

F_1, F_D, v_{Nenn} und I_1, see Sec. 10.1 "SL2-Basic motor data"

F_{peak} = identical to F_{peak} of SL2-Basic

For inverter assignment, see section 10.4.

10.3 SL2-Power System motor data



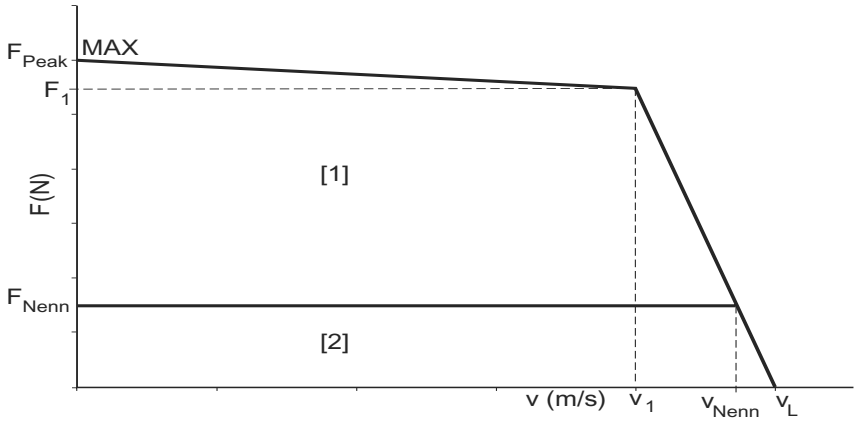


Figure 36: Characteristic curve

[1] = Dynamic limit forces
[2] = Thermal limit forces
F_{rated} = Permanent force

Rated characteristics refer to operation at
- **an ambient temperature of 40 °C**
- **an installation altitude of up to 1000 m**

F_1 = Maximum force available up to V_1
F_{Peak} = Maximum force
v_L = Theoretical maximum traveling velocity
v_1 = Velocity up to which force F_1 is available
v_{rated} = Velocity up to which the rated force is available
I_{rated} = Rated current
I_1 = Current at F_1
I_{Peak} = Maximum current
F_D = Force through magnetic attraction

Motor type	Force					Current			Cable cross section	To cable lengths	Part no. cable	Cable cross section	To cable lengths	Part no. cable
	F_{Peak}	F_1	F_{rated}	F_D	v_1	I_{Peak}	I_1	I_{rated}						
	[N]				[m/s]	[A]			[mm²]	[m]		[mm²]	[m]	
SL2-050VS	650	500	400	1480	- 3 6	- 6.0 13.9	- 4.4 10.3	- 3.1 7.6	1.5 1.5	100 100	0590 481 1 0590 481 1			
SL2-050S	1300	1000	760	2880	1 3 6	4.8 11.8 24.5	3.5 8.7 17.8	2.4 6.1 12.2	1.5 1.5 1.5	100 100 57	0590 481 1 0590 481 1 0590 481 1	2.5	100	0590 483 8
SL2-050M	1950	1500	980	4300	1 3 6	5.9 18.0 33.0	4.4 12.8 24.6	2.6 7.6 14.7	1.5 1.5 2.5	100 100 71	0590 481 1 0590 481 1 0590 483 8	4.0	100	0590 484 6
SL2-050ML	2600	2000	1280	5700	1 3 6	7.8 24.0 48.0	5.8 17.8 35.5	3.3 10.4 20.8	1.5 1.5 4.0	100 57 82	0590 481 1 0590 481 1 0590 484 6	2.5	100	0590 483 8
SL2-100VS	1325	1000	780	2950	1 3 6	4.8 14.2 24.6	3.4 10.3 17.8	2.5 7.3 12.6	1.5 1.5 1.5	100 100 57	0199 190 6 0199 190 6 0199 190 6	2.5	100	0199 192 2
SL2-100S	2650	2000	1570	5760	1 3 6	8.0 25.0 49.0	5.8 17.8 35.5	4.1 12.7 25.5	1.5 1.5 6.0	100 57 100	0199 190 6 0199 190 6 0199 196 5	2.5	100	0199 192 2
SL2-100M	3970	3000	2540	8570	1 3 6	14.2 35.0 75.0	10.3 24.6 53.3	7.9 19.1 41.2	1.5 4.0 10.0	57 100 100	0199 190 6 0199 194 9 0199 198 1	2.5	100	0199 199 2
SL2-100ML[1]	5300	4000	2700	11380	1 3	16.0 49.0	11.5 35.5	7.1 21.9	1.5 4.0	100 82	0199 190 6 0199 194 9	6.0	100	0199 196 5
SL2-150S	3900	3000	2700	8640	1 3 6	12.0 33.5 67.0	8.7 24.5 49.0	7.2 20.3 40.5	1.5 4.0 10.0	100 100 100	0199 190 6 0199 194 9 0199 198 1			
SL2-150M	5800	4500	3800	12860	1 3 6	18.0 53.0 100.0	13.1 39.0 74.5	10.1 30.1 57.0	1.5 6.0 10.0	57 100 100	0199 190 6 0199 196 5 0199 198 1[2]	2.5	100	0199 192 2
SL2-150ML	7700	6000	5500	17000	1 3 6	24.0 76.0 132.0	17.4 56.7 98.0	14.4 47.4 82.2	2.5 10.0 10.0	71 100 90	0199 192 2 0199 198 1 0199 198 1[2]	2.5	100	0199 194 9

1) SL2-100ML is not available in speed class 6 m/s.

2) Maximum permitted load on cable is 51.6 A

Electrical values refer to sine-shaped commutation and are indicated as effective values or refer to them.

F_1, F_D, v_{Nenn} und I_1, see Sec. 10.1 "SL2-Basic motor data"

F_{peak} = identical to F_{peak} of SL2-Basic

For inverter assignment, see section 10.4.

10.4 Maximum forces with MOVIDRIVE® MDX61B

Speed class 1 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® MDX61B servo controller.

The maximum forces (F_{max}) that can be reached do not depend on SL2-Basic, SL2-Advance System, SL2-Power System.

Motor V_{nrated} = 1 m/s		• MOVIDRIVE® MDX61B_A...-5_3 (400/500 V units) in SERVO operating modes (P700)											
	P [kW]	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150
	I_{rated} [A]	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32
	I_{max} [A]	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48
	Systems	F_{max} [N]											
SL2-P025S	Basic	650											
SL2-050S	Basic Advance Power	1115	1300			1300							
SL2-050M	Basic Advance Power	1380	1620	1950	1950	1950							
SL2-050ML	Basic Advance Power	1453	1696	2120	2600	2070	2600						
SL2-100VS	Basic Advance Power	1140	1325	1325	1325	1325							
SL2-100S	Basic Advance Power	1467	1703	2118	2650	2060	2650						
SL2-100M	Basic Advance Power			1953	2412	1902	2475	3050	3970				
SL2-100ML	Basic Advance Power						3000	3710	4800	5300			
SL2-150VS	Basic	1380	1615	2000	2000	1970							
SL2-150S	Basic Advance Power		1800	2230	2785	2170	2880	3490	3900				
SL2-150M	Basic Advance Power						3100	3750	4830	5800			
SL2-150ML	Basic Advance Power							4330	5240	6330	7700		
SL2-200VS	Basic			2145	2670	2090	2700						
SL2-200S	Basic						3050	3710	4810	5200			
SL2-200M	Basic								5150	6450	7800		
SL2-200ML	Basic									6840	8390	10350	
SL2-250VS	Basic			2090	2600	2040	2670	3170					
SL2-250S	Basic							3890	5000	6300			
SL2-250M	Basic								5140	6370	7810	9450	
SL2-250ML	Basic									7020	8620	12300	12600

Speed class 3 m/s

The table shows the maximum force that can be reached with the connected MOVIDRIVE® MDX61B inverter.

Motor V_{rated} = 3 m/s		• MOVIDRIVE® MDX61B_A...-5_3 (400/500 V units) in SERVO operating modes (P700)															
	P [kW]	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
	I_{rated} [A]	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32	46	60	73	89
	I_{max} [A]	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48	69	90	109.5	133.5
	Systems	F_{max} [N]															
SL2-P025VS	Basic	330															
SL2-P025S	Basic	650															
SL2-050VS	Basic Advance Power	460	537	650	650	650											
SL2-050S	Basic Advance Power			738	926	717	955	1175	1300								
SL2-050M	Basic Advance Power							1280	1640	1950							
SL2-050ML	Basic Advance Power							1290	1650	2090	2600						
SL2-100VS	Basic Advance Power						830	1020	1325								
SL2-100S	Basic Advance Power								1680	2090	2560	2650					
SL2-100M	Basic Advance Power									2455	2950	3970					
SL2-100ML	Basic Advance Power										2950	4050	5200	5300			
SL2-150VS	Basic						1065	1280	1650	2000							
SL2-150S	Basic Advance Power									2425	2950	3900					
SL2-150M	Basic Advance Power										3070	4200	5330	5800			
SL2-150ML	Basic Advance Power											4250	5400	7080	7700		
SL2-200VS	Basic								1650	2100	2610	2700					
SL2-200S	Basic										2920	4050	5200				
SL2-200M	Basic											4340	5490	7480	7800		
SL2-200ML	Basic												5680	7510	9430	10350	
SL2-250VS	Basic								2120	2610	3170						
SL2-250S	Basic											4310	5410	6300			
SL2-250M	Basic												5670	7560	9450		
SL2-250ML	Basic													8270	10340	12260	12600

Speed class 6 m/s

The table shows the maximum force that can be reached with the connected *MOVIDRIVE® MDX61B inverter.*

Motor V_{rated} = 6 m/s		• MOVIDRIVE® MDX61B_A...-5_3 (400/500 V units) in SERVO operating modes (P700)															
	P [kW]	0005	0008	0011	0014	0015	0022	0030	0040	0055	0075	0110	0150	0220	0300	0370	0450
	I_{rated} [A]	2	2.4	3.1	4	4	5.5	7	9.5	12.5	16	24	32	46	60	73	89
	I_{max} [A]	4	4.8	6.2	8	6	8.25	10.5	14.25	18.75	24	36	48	69	90	109.5	133.5
	Systems	F_{max} [N]															
SL2-P025VS	Basic			330													
SL2-050VS	Basic Advance Power				400	320	415	510	650								
SL2-050S	Basic Advance Power							675	840	1040	1280	1300					
SL2-050M	Basic Advance Power									1200	1470	1950					
SL2-050ML	Basic Advance Power										1450	2025	2600				
SL2-100VS	Basic Advance Power								850	1045	1300	1325					
SL2-100S	Basic Advance Power											2025	2600	2650			
SL2-100M	Basic Advance Power											2025	2765	3700	3970		
SL2-100ML	Basic												2800	3750	4780	5300	
SL2-150VS	Basic									1220	1470	2000					
SL2-150S	Basic Advance Power											2350	2950	3900			
SL2-150M	Basic Advance Power												3150	4220	5290	5800	
SL2-150ML	Basic Advance Power														5600	6570	7700
SL2-200VS	Basic											1860	2390	2700			
SL2-200S	Basic													3760	4710	5200	
SL2-250VS	Basic											2150	2730	3170			
SL2-250S	Basic													4150	5180	6130	6300

10.5 Part numbers for MOVIDRIVE® MDX61B

The SL2 linear motors can be operated together with MOVIDRIVE® MDX61B servo controllers from SEW-EURODRIVE.

MOVIDRIVE® MDX61B unit designation

MDX60 B 0011 - 5 A 3 - 4 00

Version	00 = Standard 0T = Application XX = Special unit
Quadrants	4 = 4Q (with brake chopper)
Connection type	3 = 3-phase
Radio interference suppression on the line side	B = Radio interference suppression B A = Radio interference suppression A 0 = No radio interference suppression
Supply voltage	5 = 380 ... 500 V_{AC} 2 = 200 ... 230 V_{AC}
Recommended motor power	0011 = 1.1 kW
Version B	
Series	60 = no options can be installed 61 = options can be installed

For the connection of the AL1H motor encoder, the HIPERFACE® encoder card type DEH11B option with the part number 8243107 must always be used.

For more information, refer to the MOVIDRIVE® B system manual.

Assignment of part numbers

MOVIDRIVE® MDX61B

Unit part number	MOVIDRIVE® MDX61B
08286256	MDX61B0005-5A3-4-08
08286264	MDX61B0008-5A3-4-08
08286272	MDX61B0011-5A3-4-08
08286280	MDX61B0014-5A3-4-08
08286299	MDX61B0015-5A3-4-08
08286302	MDX61B0022-5A3-4-08
08286310	MDX61B0030-5A3-4-08
08286329	MDX61B0040-5A3-4-08
08286337	MDX61B0055-5A3-4-08
08286345	MDX61B0075-5A3-4-08
08286353	MDX61B0110-5A3-4-08
08286361	MDX61B0150-503-4-08
08286388	MDX61B0220-503-4-08
08286396	MDX61B0300-503-4-08
08286418	MDX61B0370-503-4-08
08286426	MDX61B0450-503-4-08
08286434	MDX61B0550-503-4-08
08286442	MDX61B0750-503-4-08
08286450	MDX61B0900-503-4-08
08286469	MDX61B1100-503-4-08
08286477	MDX61B1320-503-4-08

10.6 Technical data of AL1H absolute linear measuring system

The absolute linear measuring system corresponds to the linear measuring system from SICK/Stegmann.

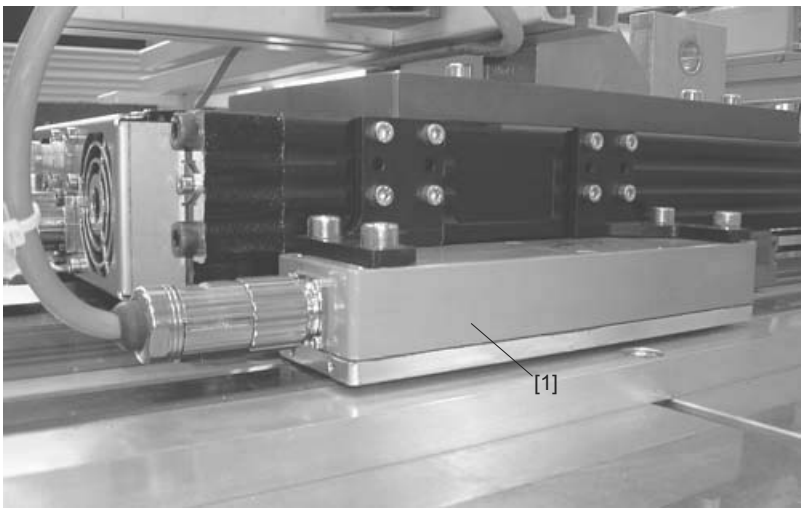


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Figure 37: AL1H linear measuring system [1]

Technical data and characteristic features to DIN 32878:

General data	
Measuring length	max. 40 m
Magnetic tape length (measuring length)	+130 mm[1)]
Reproducibility	± 10 µm
Measurement accuracy	typ. ± 0.3 mm/m at 20 °C
Max. traveling velocity	6 m/s
Temperature expansion coefficient T_k steel band	16 µm/°C/m
Position tolerances and dimensions	See scale drawing
Weight • **Sensor part** • **Magnetic tape**	 0.685 kg 0.160 kg/m
Materials • **Sensor parts** • **Magnetic tape** • **Stainless steel band**	 AlmgSiPbF28 Tromaflex 928 No. 1.4435
Working temperature range	0 °C ... +70 °C
Operating temperature range	–20 °C ... +85 °C
Storage temperature range	–40 °C ... +100 °C
Enclosure	IP65

1) Constant due to technical limitations

HIPERFACE® interface data

General data	
Cycle length	5 mm ±3 %
Position resolution (cycle length/32 = 5 mm/32)	156.25 µm
Initialization time	2500 ms
Supply voltage	7 V ... 12 V
Max. current consumption without load	650 mA
Interface signals	
Process data channel • **SIN, COS** • **REFSIN, REFCOS**	 0.9 Vpp ... 1.1 Vpp 2.2 V ... 2.8 V
Non-linearity within a sine, cosine cycle, differential non-linearity	± 50 µm
Parameter channel	to EIA 485

External magnetic fields should not pass the surface of the material measure 64 mT (640 Oe; 52 kA/m) as this could cause irreparable damage to the coding on the material measure. Magnetic fields > 1mT on the measuring system influence the measuring accuracy.

Scale drawings and position tolerances

General tolerances to DIN ISO 2768-mk

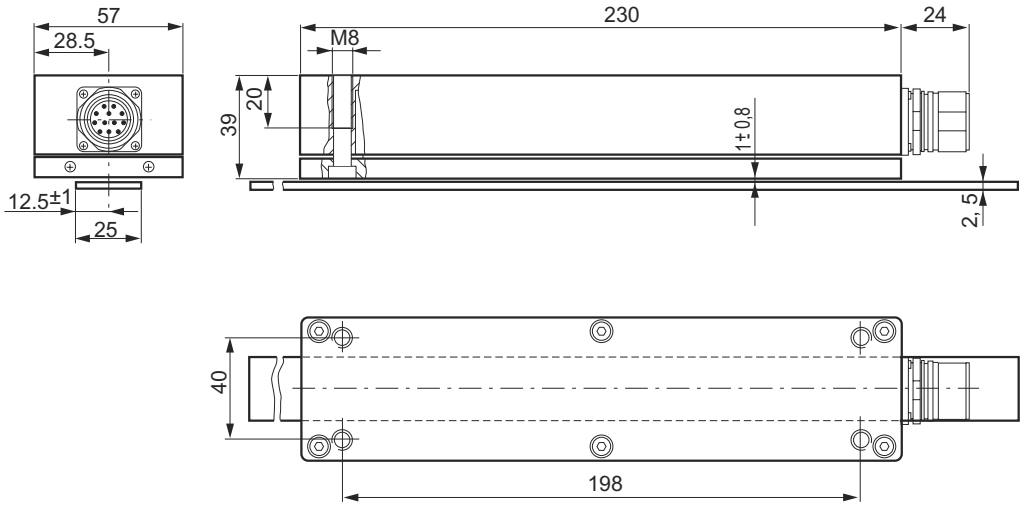
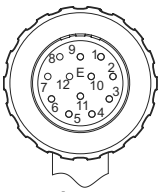
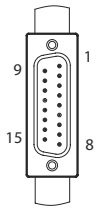


Figure 38: Scale drawings and position tolerances

Connection assignment

Connection assignment of the AL1H linear measuring system on MOVIDRIVE® compact MCH / MOVIDRIVE® MDX..B

Encoder end					Connection MOVIDRIVE® *compact* MCH MOVIDRIVE® MDX..B	
Plug connector	**Contact no.**	**Description**	**Cable core color**	**Description**	**Contact no.**	**Plug connector**
ASTA021FR **198 921 9** 12-pin with socket contacts  **View X**	1	S3 (cosine -)	Blue (BU)	S3 (cosine -)	9	Sub-D 15-pin MOVIDRIVE® *compact* MCH  MOVIDRIVE® B **View Y**
	2	Data (+)	Black (BK)	Data (+)	4	
	3	Unassigned		Unassigned	3	
	4	Unassigned		Unassigned	5	
	5	S2 (sine +)	Yellow (YE)	S2 (sine +)	2	
	6	S4 (sine -)	Green (GN)	S4 (sine -)	10	
	7	Data (-)	Violet (VT)	Data (-)	12	
	8	S1 (cosine +)	Red (RD)	S1 (cosine +)	1	
	9	Unassigned		Unassigned	6	
	10	GND	Gray/pink (GY/PK) / pink (PK)	GND	8	
	11	Unassigned		Unassigned	7	
	12	U_S	Gray (GY)	U_S	15	
		Unassigned	Unassigned	Unassigned	11	
		Unassigned	Unassigned	Unassigned	13	
		Unassigned	Unassigned	Unassigned	14	

Feedback cables and extension cables for the AL1H linear measuring system are the same for MOVIDRIVE® *compact* MCH and MOVIDRIVE® MDX..B.

Function	SEW part number	Description
Linear sensor	1332 8263	AL1H, HIPERFACE®, 12-pin M23 unit connector
Measuring tape	1332 8271	Magnet tape with adhesive tape
Mount-on components	1332 8301	L230 LinCoder® mount-on components for SL2 Advance System / SL2-Power System, cooling unit
Feedback cable	1332 8328	Encoder cable for MOVIDRIVE® compact, approved for use with cable carriers
	0595 1518	Encoder cable for MOVIDRIVE® B, approved for use with cable carriers
Extension cable for feedback cable	0199 5405	cable carrier installation

Additional information

Data for the AL1H linear measuring system in this documentation were based on the data available from SICK / Stegmann at the time of printing. The design and units are subject to change. The data from SICK / Stegmann apply.

Current information can be found in

- the operating instructions from SICK / Stegmann, which are enclosed with the linear motor

or

- at www.stegmann.de

Encoder mount-on components

For the SL2-Advance System and SL2-Power System, mount-on components are available for these encoders under the part number 13328301.

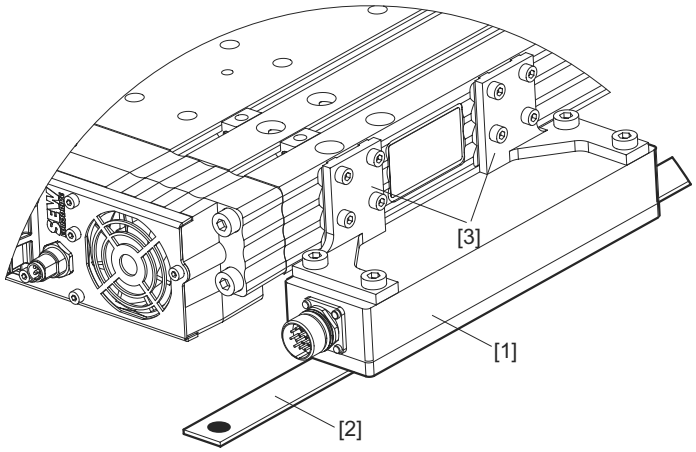


Figure 39: AL1H: Linear sensor and subsegment of the measuring tape

[1] Linear sensor
[2] Measuring tape
[3] Encoder mount-on components

10.7 Linear guide systems for SL2-Advance and SL2-Power System

The following guide systems can be installed on the SL2-Advance System and the SL2-Power System primaries.

SL2 - P050VS/S/M/ML Advance/Power System

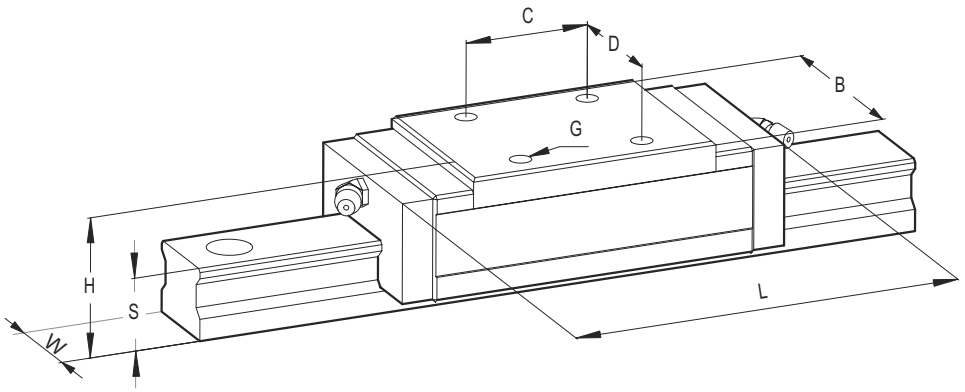


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Figure 40: Guide systems

Guide systems (standard mounting) to DIN 645-1 version 3M

$L_{max.}$ [1]	B	C	D	H	W	$S_{max.}$	G
			[mm]				
SL2-P050VS = 94 SL2-P050S = 133 SL2-P050M = 144 SL2-P050ML = 190	48	35	35	40	23	24	M6x8

1) The max. length is dependent on the size

Manufacturer	Size
THK	HSR 25 R (standard) SHS 25 R (with ball chain)
INA	KUVE 25 H KUVE 25 B KT H (with Quadspacer)
NSK	LAH 25 ANZ
Schneeberger	BMC 25
HIWIN	HGH25CA

SL2 - P100VS/S/M Advance/Power System

Guide systems (standard mounting) to DIN 645-1 version 3M

$L_{max.}$ [1]	B	C	D	H	W	$S_{max.}$	G
			[mm]				
SL2-P100VS = 94 SL2-P100S = 140 SL2-P100M = 140	60	40	40	45	28	25	M8x10

1) The max. length is dependent on the size

Manufacturer	Size
THK	HSR30R SHS 30R (with ball chain)
INA	KUVE 30 H

SL2 - P100ML Advance/Power System

Guide systems (standard mounting, long guide carriages) to DIN 645-1 version 3L

$L_{max.}$	B	C	D	H	W	$S_{max.}$	G
[mm]							
170	60	60	40	45	28	25	M8x10

Manufacturer	Size
THK	HSR30LR SHS 30LR (with ball chain)
INA	KUVE 30 HL

SL2 - P150S/ML Advance/Power System

Guide systems (standard mounting) to DIN 645-1 version 3M

$L_{max.}$	B	C	D	H	W	$S_{max.}$	G
[mm]							
170	70	50	50	55	34	29,8	M8x10

Manufacturer	Size
THK	HSR 35R SHS 35R (with ball chain)
INA	KUVE 35 H
NSK	LAH 35 ANZ
Schneeberger	BMC 35
HIWIN	HGH35CA

SL2 - P150M Advance/Power System

Guide systems (standard mounting) to DIN 645-1 version 3L

$L_{max.}$	B	C	D	H	W	$S_{max.}$	G
[mm]							
250	70	72	50	55	34	29,8	M8x10

Manufacturer	Size
THK	HSR 35LR SHS 35LR (with ball chain)
INA	KUVE 35 HL
NSK	LAH 35 BNZ
Schneeberger	BMD 35
HIWIN	HGH35HA

11 Declaration of Conformity

11.1 SL2 synchronous linear motors

DIN EN ISO 9001

SEW EURODRIVE

SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Str. 42
D-76646 Bruchsal

Konformitätserklärung

für Linearmotoren
nach ISO/IEC Guide 22, nach DIN EN 45014 Seite 1/1

Declaration of conformity

for linear motors
in accordance with ISO/IEC Guide 22, in accordance with DIN EN 45014 Page 1/1

SEW-EURODRIVE erklärt die Konformität des Produktes
declares that the following product

Typ / Model Synchrone-Linearmotor Reihe SL2-...

Ab.-Nr./ AB.-No.

mit der
are conform with the

Niederspannungsrichtlinie 73/23EG
Low Voltage Directive 73/23EC
und der / and the
EMV-Richtlinie 89/336EG
EMC Directive 89/336EC

auch in Verbindung mit
also when combined with

Optionen und Zubehör
options and asseccories

Angewandte harmonisierte Normen: EN 60204-1
applied harmonized standards: EN 50081-1
EN 50082-2

Die Einhaltung der EMV-Richtlinie setzt einen EMV-gerechten Einbau der Produkte, die Beachtung der spezifischen Installationshinweise und der Produktdokumentation voraus. Dies wurde an bestimmten Anlagekonfigurationen nachgewiesen.

Adherence to the EMC-Directive requires EMC-compliant installation of the products and compliance with the specific installation instructions and product documentation.
Conformity with these Directives was established based on certain plant configurations.

SEW-EURODRIVE GmbH & Co KG

Bruchsal , 25.02.2004 ppa.

E. Dörr
Funktion: Vertriebsleitung / Deutschland
Function: Head of Sales / Germany

Ort und Datum der Ausstellung
Place and date of issue

12 Index

A
AL1H, Technical data 77

C
Cable cross section 40
Cables 43
Coating 27
Corrosion protection 26

D
Documentation 11

E
Electrical connection 39
EMC measures 42

F
Fan 54

I
Inspection 65
Installation of customer components on primary 37
Installation of SL2 secondaries 33
Installation of SL2-Advance System 31
Installation of SL2-Basic 30
Installation of SL2-Power System 31
Installation of the AL1H measuring system 35
Installation tolerances 28
Installation, electrical 39
Installation, mechanical 28

L
Linear guide systems, Technical data 81
Linear measuring system, Technical data 77

M
Maintenance 65
Malfunctions 62
Mechanical load capacity 36
Motor cableskabel 43
Motor cooling unit 20
MOVIDRIVE® Part numbers 75

N
Nameplate 18

O
Operational environment 4
Overview of types 11

P
Packaging 23
Power cable 43
Primaries 20
Product description 11
Product design 12

R
Return delivery 27

S
Safety functions 4
Safety notes 7
Scope of delivery 20
Secondaries 20
Startup 55
Storage conditions 26
System components 13
System environment 11

T
Technical Data 66
TF evaluation unit 42
Transport 21
Transportation 21
Type code 15

U
Unit designation 75

W
Waste disposal 5

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Germany			
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	Lyon	SEW-USOCOME Parc d'Affaires Roosevelt Rue Jacques Tati F-69120 Vaulx en Velin	Tel. +33 4 72 15 37 00 Fax +33 4 72 15 37 15
	Paris	SEW-USOCOME Zone industrielle 2, rue Denis Papin F-77390 Verneuil l'Etang	Tel. +33 1 64 42 40 80 Fax +33 1 64 42 40 88
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Algeria			
Sales	**Alger**	Réducom 16, rue des Frères Zaghnoun Bellevue El-Harrach 16200 Alger	Tel. +213 21 8222-84 Fax +213 21 8222-84

Argentina			
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Australia			
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	Townsville	SEW-EURODRIVE PTY. LTD. 12 Leyland Street Garbutt, QLD 4814	Tel. +61 7 4779 4333 Fax +61 7 4779 5333 enquires@sew-eurodrive.com.au

Austria			
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Belgium			
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Cameroon			
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Canada			
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Chile			
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Colombia			
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Croatia			
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Czech Republic			
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Denmark			
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Estonia			
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Gabon			
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Great Britain			
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Greece			
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Latvia			
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Lithuania			
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Luxembourg			
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Mexico			
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Morocco			
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New Zealand			
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Peru			
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South Africa			
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	Durban	SEW-EURODRIVE (PROPRIETARY) LIMITED 2 Monaceo Place Pinetown Durban P.O. Box 10433, Ashwood 3605	Tel. +27 31 700-3451 Fax +27 31 700-3847 dtait@sew.co.za
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Sweden			
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Switzerland			
Assembly **Sales** **Service**	**Basel**	Alfred Imhof A.G. Jurastrasse 10 CH-4142 Münchenstein bei Basel	Tel. +41 61 417 1717 Fax +41 61 417 1700 http://www.imhof-sew.ch info@imhof-sew.ch
Thailand			
Assembly **Sales** **Service**	**Chon Buri**	SEW-EURODRIVE (Thailand) Ltd. Bangpakong Industrial Park 2 700/456, Moo.7, Tambol Donhuaroh Muang District Chon Buri 20000	Tel. +66 38 454281 Fax +66 38 454288 sewthailand@sew-eurodrive.com
Tunisia			
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Turkey			
Assembly **Sales** **Service**	**Istanbul**	SEW-EURODRIVE Hareket Sistemleri San. ve Tic. Ltd. Sti. Bagdat Cad. Koruma Cikmazi No. 3 TR-34846 Maltepe ISTANBUL	Tel. +90 216 4419163 / 164 3838014/15 Fax +90 216 3055867 sew@sew-eurodrive.com.tr
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USA			
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	Philadelphia/PA	SEW-EURODRIVE INC. Pureland Ind. Complex 2107 High Hill Road, P.O. Box 481 Bridgeport, New Jersey 08014	Tel. +1 856 467-2277 Fax +1 856 845-3179 csbridgeport@seweurodrive.com
	Dayton	SEW-EURODRIVE INC. 2001 West Main Street Troy, Ohio 45373	Tel. +1 937 335-0036 Fax +1 937 440-3799 cstroy@seweurodrive.com
	Dallas	SEW-EURODRIVE INC. 3950 Platinum Way Dallas, Texas 75237	Tel. +1 214 330-4824 Fax +1 214 330-4724 csdallas@seweurodrive.com
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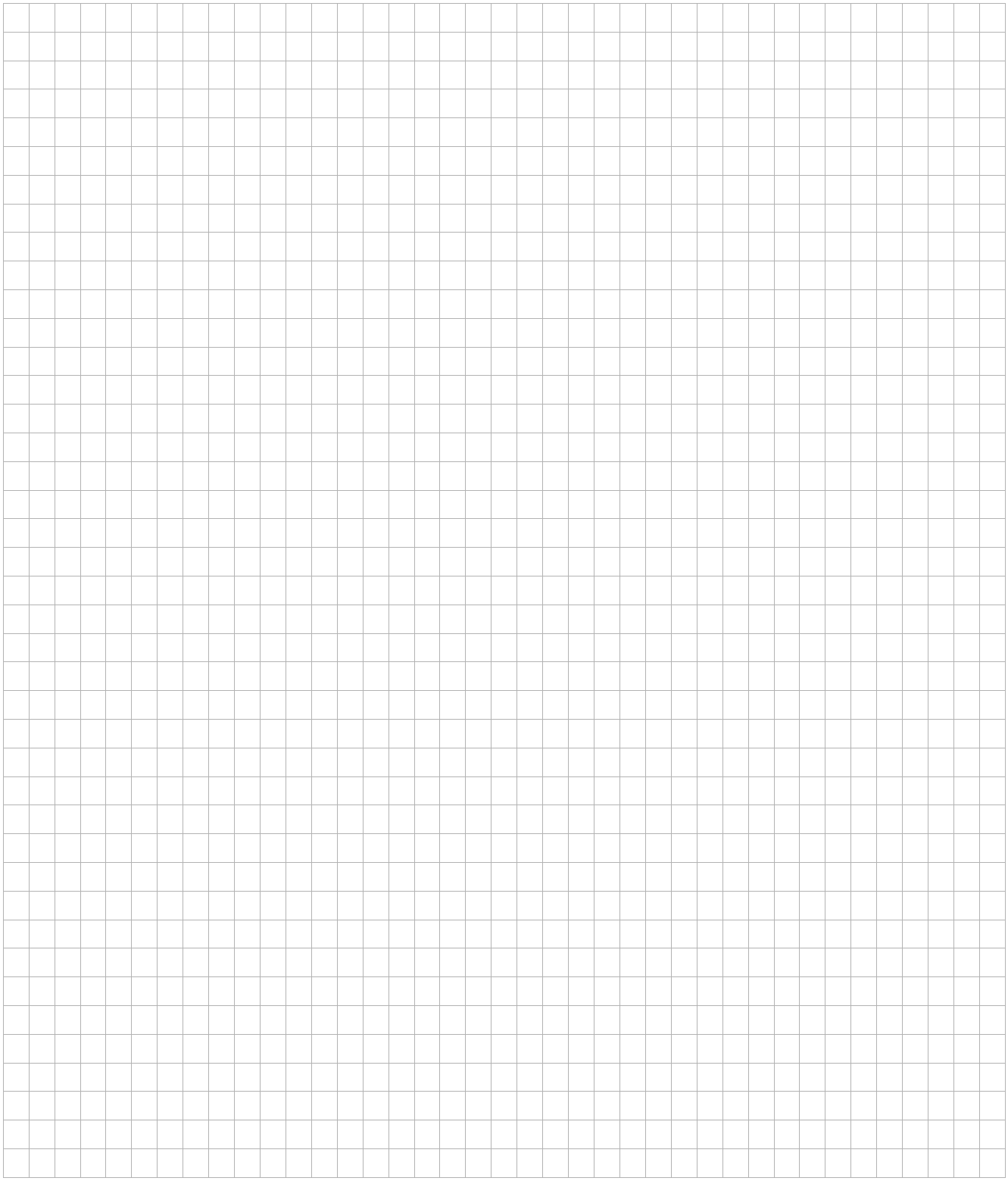
Venezuela			
Assembly **Sales** **Service**	**Valencia**	SEW-EURODRIVE Venezuela S.A. Av. Norte Sur No. 3, Galpon 84-319 Zona Industrial Municipal Norte Valencia, Estado Carabobo	Tel. +58 241 832-9804 Fax +58 241 838-6275 http://www.sew-eurodrive.com.ve sewventas@cantv.net sewfinanzas@cantv.net



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